



THE NAVY'S ENERGY & ENVIRONMENTAL MAGAZINE

Currents

winter 2013

Raising the War of 1812

USS SCORPION MAY BE PART OF
BICENTENNIAL CELEBRATION

From the 1 Gigawatt Task Force—A Strategy for Renewable Energy
The Evolution of the Navy's Industrial Radiological Control Program
Two Award Programs Recognize Navy & Marine Corps
Energy & Water Saving Achievements

2012
NAVAL
ENERGY
FORUM
POSTER
INSIDE



THE NAVY'S ENERGY & ENVIRONMENTAL MAGAZINE

Currents

Chief of Naval Operations
Energy and Environmental Readiness Division

DIRECTOR

Rear Admiral Kevin R. Slates

DEPUTY DIRECTOR

Mr. John P. Quinn

ACTING DIRECTOR

COMMUNICATION AND OUTREACH

Kenneth Hess

Currents Staff

MANAGING EDITOR

Bruce McCaffrey
Bruce McCaffrey Consulting, Inc.
brucemccaffrey@sbcglobal.net
773-376-6200

CONTRIBUTING WRITERS

Kathy Kelley
Cordelia Shea

ART DIRECTOR

Victoria Bermel

GRAPHIC ARTISTS

Amy Jungers
John Lambert

DISTRIBUTION MANAGER

Lorraine Wass
ljwass@surfbest.net
207-384-5249



"Like" *Currents* on Facebook by logging onto your account at www.facebook.com, searching for "U.S. Navy Currents magazine," then clicking the "Like" button. You can also find us at www.facebook.com/navycurrents.



Follow *Currents* on Twitter at www.twitter.com/navycurrents.



View the *Currents* photo archive on Flickr at www.flickr.com/photos/navycurrents.



cover

U.S. Navy underwater archaeologists are preparing to unearth a gunboat scuttled nearly 200 years ago in the Patuxent River—probably the USS Scorpion—a wreck that might hold answers about the Navy's role in the ultimately unsuccessful defense of Washington, D.C., during the War of 1812.

8 Raising the War of 1812

USS Scorpion May Be Part of Bicentennial Celebration

Currents (ISSN 1544-6603) is the official energy and environmental magazine of the U.S. Navy, Chief of Naval Operations Energy and Environmental Readiness Division (N45).

This magazine is an authorized publication for members of the Department of Defense. Statements made in the N45 Outlook column reflect the official policy of the Navy. The contents in the remainder of the magazine are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the United States Navy. Inclusion of any product or service in any *Currents* feature article does not constitute an endorsement by the Navy. The Navy encourages all readers to check with the appropriate supervising authority prior to using any product or service mentioned in the magazine.

Article submissions should be submitted directly to *Currents*' Managing Editor, Bruce McCaffrey, using the *Currents* article template. A public affairs review must be completed before *Currents* management can consider an article for publication.

Browse the *Currents* archives and subscribe to the magazine at www.greenfleet.dodlive.mil/currents-magazine. Contact Lorraine Wass, *Currents*' Distribution Manager, with any changes to mailing addresses or shipping quantities.

features

- 18 **The Evolution of the Navy's Industrial Radiological Control Program**
Today's Program Showcases Successful Remediation Actions, New Instruction & Guidance
- 32 **The Art of the Long View**
Highlights from the 2012 Naval Energy Forum



The Art of the Long View
Naval Energy Forum 2012 Poster

- 40 **Two Award Programs Recognize Navy & Marine Corps Energy & Water Saving Achievements**
Back-to-Back Ceremonies Celebrate Winners in SECNAV Energy and Water Awards & FEMP Energy
- 60 **From the 1 Gigawatt Task Force—A Strategy for Renewable Energy**
Meeting Secretary Mabus' Energy Goals for Installations
- 65 **NESDI FY13 Needs Solicitation Yields Twenty Priority Needs**
Annual Process Once Again Successful at Tapping into Unresolved Environmental Needs
- 68 **LMR Program Holds First In-Progress Review**
Researchers Highlight Successes, Management Team Convenes to Steer Future Investments



departments

- 4 **N45 Outlook**
- 52 **Trends of the Environment**
- 75 **Best Shot**

Continuing Focus on Energy Culture Change, Phase II & Compatibility

WELCOME TO THE winter 2013 issue of *Currents*. As I write these words, I've been serving as Director of the Chief of Naval Operations Energy and Environmental Readiness Division (N45) for about three months. I'm excited to lead N45, as I believe our role of developing policy and programming resources to support the Fleet is a vital function. I have an environmental engineering background, and am passionate about the environment and our many exciting initiatives to shape how we think about and use energy.

Prior to coming here, I had several years working for the Naval Facilities Engineering Command both in command and staff positions. I also served as Assistant Chief of Staff for Installations and Environment at Marine Corps Base Camp Lejeune, helping them to manage their facilities and environmental challenges. My operational experience has been with the Naval Construction Force (Seabees), including deployments in support of the Marine Corps and Army in Desert Shield and Kosovo. During those deployments I quickly came to understand the importance of ensuring that our expeditionary and other ground forces had the fuel they needed to meet their mission, and the many challenges associated with delivering that fuel.

I became aware of Task Force Energy soon after it stood up in 2009. I thought it was a brilliant idea to establish this group to focus our energy efforts and initiatives on the goal of reducing consumption and providing alternative options to conventional fossil fuels with the real intent of increasing warfighting and combat capability (more time on station and reduced resupply). I now have the privilege and responsibility to guide our strategy for maintaining momentum on these important initiatives, despite the high likelihood of diminishing resources being available in the near future to accomplish them. It's the right thing to do to avoid burning unnecessary gallons of fuel, stay on station longer, fly more missions, and ultimately save lives. Our senior leadership understands this and remains focused on it, but one of the major challenges continues to be influencing and changing our culture change down to the deckplate level. We cannot afford to simply think of energy as a readily available resource to power our equipment. We need to understand how we use energy, seek innovative ideas on how to reduce that consumption, and ensure that our energy saving approaches are widely

understood and accepted/used day-to-day across the Navy. Great ideas come from those that operate and use our systems every day, so please keep those innovative ideas flowing. As we drive toward culture change, I remain committed to working with the systems

commands to get energy efficiency initiatives into the hands of the Fleet as quickly as possible.

Along these lines, in September the Naval Sea Systems Command awarded a multi-year contract to back-fit destroyers with hybrid electric drive propulsion beginning in fiscal year 2015. This required extensive coordination with the fleets to ensure that key technical specifications could be met and that the timeframe for installing the systems will be achievable. These retrofitted platforms could save an average of 21,000 gallons of fuel per year, which would reduce fuel costs and enable these ships to travel further between refuelings. At the Naval Postgraduate School in Monterey, a new class of students will graduate this fall with two-year energy masters degrees. With vital skills in designing and executing policies that take energy into account as a capability while meeting acquisition and operational requirements, these graduates will be qualified for specially coded jobs within the Navy.

A major effort for this office was coordinating the Naval Energy Forum on 17 October. As a newcomer, I was thankful the N45 staff had been through the intensive process of planning it before and really knew the ropes. I found the various panels on topics such as international, industry, acquisition and expeditionary aspects of energy highly informative, and appreciated the chance to hear perspectives from Secretary Mabus, Sharon Burke (Assistant Secretary of Defense for Operational Energy Plans and Programs), and other top Navy and Marine Corps leaders. It was a very successful day—for more details, check out the Naval Energy Forum summary article on page 32 of this issue.



For the first time in six years, we in N45 also brought together subject matter experts and leaders in the natural resources, environmental planning, and marine species protection areas for a training workshop in Norfolk on 18-19 September, attended by over 300 professionals from across the Navy. Members of the compatibility and readiness sustainment community, including community plans and liaison officers, radar experts, and range managers also participated. We were fortunate to have the Honorable Roger Natsuhara, Principal Deputy Assistant Secretary of the Navy for Energy, Installations and Environment, as our keynote speaker. Participant feedback indicates the workshop was valuable for getting people up to speed on recent changes to policy and new technical requirements, sharing lessons learned, and developing consistent approaches to address emerging challenges.

Navy-wide, one of the most far-reaching initiatives in which we're engaged right now is our Phase II at-sea environmental planning. Phase II consolidates areas from 17 environmental impact statements (EIS), developed in Phase I, into five more comprehensive EIS documents. At-sea training, testing and research activities are included, and potential impacts on marine mammals from these activities is being analyzed more consistently with the aid of the Navy Acoustic Effects Model (NAEMO), a mathematical model developed by the Naval Undersea Warfare Center Newport with insights from other Navy and independent scientists and engineers.

unique training and operational capabilities. For those locations with minimal development nearby, surrounding areas are becoming prime opportunities for renewable energy projects. The Navy generally supports these initiatives, but needs to ensure they don't impact our mission. My staff continues to work closely with the Department of Defense (DoD) Siting Clearinghouse, Secretariat and Commander Navy Installations staff, developers, technical experts, and potentially affected bases to this end. As a recent example, the ceremonial signing of an agreement for South Texas took place 27 November at Naval Air Station (NAS) Kingsville. This was the culmination of two years of negotiations with E. On Climate and Renewables North America (a wind farm developer), Navy and DoD, in which the company agreed to provide funding for technical mitigation measures and related studies, participate in a Navy-led compatibility working group, and curtail wind farm operations under certain conditions if needed to preserve radar capability at NAS Kingsville and NAS Corpus Christi. This approach may serve as a model for future agreements.

With only a short time here on the job, I have been absolutely impressed with the knowledge of the staff here at N45. Largely behind the scenes, this team handles an incredible workload in support of policy areas vital to the Navy and the Fleet. The staff members are not only tech-



Great ideas come from those that operate and use our systems every day.

In Phase II news, the National Marine Fisheries Service (NMFS) will likely publish the proposed rules for the Atlantic Fleet Training and Testing (AFTT) and the Hawaii-Southern California Training and Testing (HSTT) EISs in the Federal Register in January 2013. That will begin a 45-day period for public comments. NMFS will consider those comments in developing the AFTT and HSTT final rules, and the Navy will address any applicable comments in the final EISs. While this represents great progress, we still have much work to do to get the new permits in place prior to our existing permits expiring in January 2014.

On the compatibility and readiness sustainment front, we have installations and facilities around the U.S. with

nically skilled, but also passionate about their jobs. They have built excellent relationships with the Secretariat staff, the other N-codes, the fleets and the systems commands, and that makes the team all the more effective.

I look forward to working with more of the talented staff here and many of you, the readers of *Currents*, as I continue getting up to speed and helping the organization steam forward on these complex issues. Thank you for your interest in and continued support of the Navy's energy and environmental initiatives. ⚓

Rear Admiral Kevin R. Slates

Director, Chief of Naval Operations Energy and Environmental Readiness Division

“KEEP *CURRENTS* ON YOUR must read” list

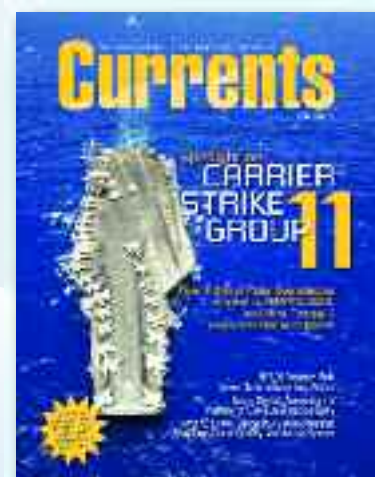
VERIFY YOUR SUBSCRIPTION THIS WINTER SO WE STAY ON YOUR READING LIST

Winter is coming, with long cold nights (in some places, anyway). It is a good season to stock up on interesting reading, including *Currents* magazine. To be certain that you have *Currents* ready and waiting, we need you to take action and verify your subscription.

Has your address changed? Do you live your life in the digital world these days and only want to read *Currents* magazine online? Or do you want to continue to receive a hardcopy of the magazine and be notified once our digital versions are available online? Either way, we need to hear from you.

Currents magazine has two online forms—a digital magazine and downloadable PDF. When you subscribe to the online version of *Currents*, you save paper and trees while having the convenience of quick, digital access. You also help us to keep our printing and mailing costs under control by going digital.

In order to stay on our mailing list and not be left out in winter's cold, we need you to verify your subscription and specify how you would like to receive the magazine—hardcopy, digital or both.

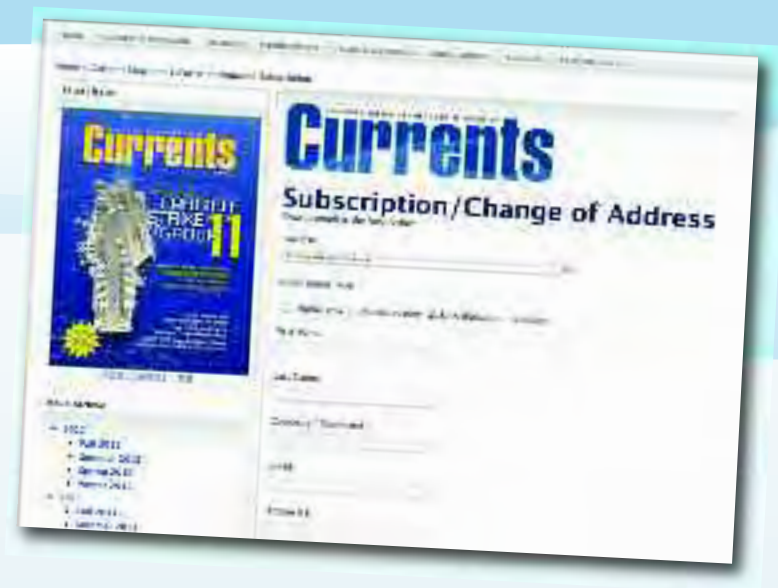


So before winter sets in, go to the *Currents* web page at <http://greenfleet.dodlive.mil/currents-magazine/subscription>. Provide your complete mailing address including your email address (we never share it) then tell us how you would like to receive the magazine. If you "go digital," we'll let you know via email when the latest issue is available online. And if you want to continue receiving a hardcopy of our annual calendar, we will need your complete mailing address.

Be sure to have *Currents* on your winter reading list by verifying your subscription today!

Before winter is over, go to the *Currents* web page at <http://greenfleet.dodlive.mil/currents-magazine/subscription> to verify your subscription.

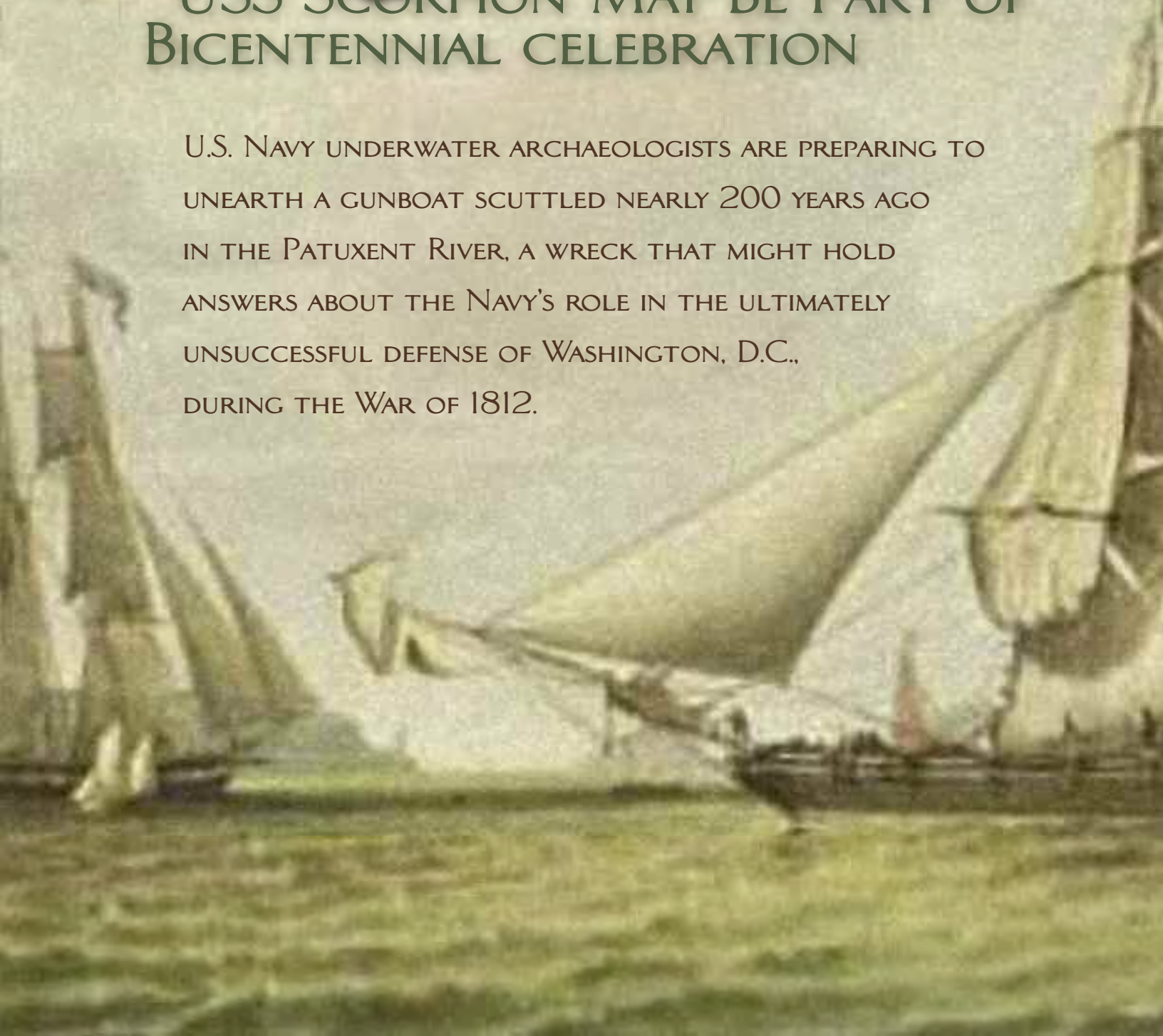
Scan this QR code with your Smartphone to go right to the *Currents* subscription page.



Raising the War

USS SCORPION MAY BE PART OF BICENTENNIAL CELEBRATION

U.S. NAVY UNDERWATER ARCHAEOLOGISTS ARE PREPARING TO
UNEARTH A GUNBOAT SCUTTLED NEARLY 200 YEARS AGO
IN THE PATUXENT RIVER, A WRECK THAT MIGHT HOLD
ANSWERS ABOUT THE NAVY'S ROLE IN THE ULTIMATELY
UNSUCCESSFUL DEFENSE OF WASHINGTON, D.C.,
DURING THE WAR OF 1812.



of 1812

It is possible that the wreck, discovered in 1979 in a forgotten turn of the Maryland river's murky waters, is that of USS Scorpion, the flagship of a scrappy, out-gunned American flotilla commanded by Commodore Joshua Barney that doggedly harassed the British Navy in a bid to break up a blockade that threatened Eastern Seaboard cities in 1814.

Officials are hoping to determine the boat's identity as part of the bicentennial celebrations of the War of 1812.

IT IS POSSIBLE THAT THE WRECK, DISCOVERED IN 1979 IN A FORGOTTEN TURN OF THE MARYLAND RIVER'S MURKY WATERS, IS THAT OF USS SCORPION.

"Finding Barney's sword," joked George Schwarz, head conservator and an archaeologist at the U.S. Navy's Underwater Archaeology Branch at the Naval History and Heritage Command (NHHC), "or the name Scorpion painted on the side would be nice."





FOR ALMOST 200 YEARS, THE SHIPS LAY UNDISTURBED BENEATH A THICK LAYER OF SILT.



Commodore Joshua Barney.

On April 28, 1814, Barney and his flotilla of 16 gunboats set out from Baltimore to confront the British, whose blockade of the Chesapeake Bay prevented the U.S. Navy from defending against raids on Baltimore, Norfolk and Washington, D.C. Throughout the summer, Barney and his crew baited the British, attacking and then retreating into the shallow waters of the Patuxent River.

Barney's flotilla did not stop the invading forces, but they did divert resources and buy time for Washington to prepare its defenses.

At the end of the summer, facing overwhelming odds and imminent capture, Barney disembarked his men from the flotilla and marched to the defense of Washington, D.C., and the Battle of Bladensburg.

Left behind on the Patuxent, Lt. Solomon Frazier followed Barney's last orders and scuttled the flotilla rather than be captured. When British Rear Admiral George Cockburn arrived at the scene, he was just in time to describe 16 ships from this "formidable and so much vaunted flotilla" as they were "in quick succession blown to atoms."

For almost 200 years, the ships lay undisturbed beneath a thick layer of silt. As the waters shifted over time, some vessels likely disappeared beneath the surrounding marshlands, while others faded into the riverbed.

Then, in 1979, the Patuxent River Submerged Cultural Resources Survey team discovered a wreck and, on board, a series of artifacts that suggested it might be Scorpion:

- A set of surgical scissors that might have belonged to the surgeon of the flotilla hospital, likely located on Scorpion.
- A grog cup with the initials "C.W." stamped on one side, perhaps belonging to Caesar Wentworth, an African American cook in the flotilla.

THE BASICS ABOUT THE SUNKEN MILITARY CRAFT ACT

The U.S. Constitution grants the U.S. government property rights to all sunken military craft, regardless of age, unless the Navy expressly gives up its rights to the craft. Divers should be aware that although diving on military sites is permitted, disturbing a sunken military craft or removing its contents can have significant penalties.

The 2005 Sunken Military Craft Act reinforces indefinite government ownership of U.S. sunken military craft. Specifically, the Act protects sunken ships and aircraft from "any activity directed at sunken military craft that disturbs, removes, or injures any sunken military craft." The Act protects craft wherever they are located (even internationally). NHHHC administers a permitting regime that allows applicants to conduct research or other activity on sunken military craft when there is sufficient academic, historical, and educational value.

CONTINUED ON PAGE 14



Artifacts recovered from the 1979 archaeological investigation include ceramic bowls, a tooth key, a pair of surgical scissors, a gunner's pick, a clay pipe and stem, a grog cup and a sounding weight.

Iron block before conservation treatment, likely part of the ship's ballast, recovered during the 2011 field investigation.



Detail of a grog cup with the incised letters "CW" which archaeologists believe may be the initials of USS Scorpion's cook Caesar Wentworth.

Iron surgical scissors recovered during the 1979 field investigation (left) and the 2011 field investigation (right).



Glass pharmaceutical vial recovered during the 2011 field investigation (center, foreground) with similar glass vials recovered from the 1979 field investigation.



Ceramic vessel recovered during the 2011 field investigation.

THE BASICS ABOUT THE NHHC ARCHAEOLOGY AND CONSERVATION LABORATORY

*I*n a dusty warehouse of crates and metal boxes, with a whiteboard welcome sign announcing the entrance, underwater archaeologists at the laboratory are preserving and protecting Navy history.

The Naval History and Heritage Command's Underwater Archaeology Branch (UAB) manages a database of more than 3,000 shipwrecks and 14,000 sunken aircraft worldwide. It's a daunting job for the small staff of archaeologists, conservators, and semester-long undergraduate and graduate interns.

State and Federal agencies, volunteer diving organizations, and Navy dive teams all partner with the UAB to locate and identify Navy wreck sites.

"If you have the chance to find a shipwreck, to see a bit of Navy history up close, who wouldn't want to be a part of that?" said Dr. Robert Neyland, Director of the UAB.

Once U.S. Navy wrecks are located and excavated, the Archaeology and Conservation Laboratory preserves and studies recovered artifacts, incorporating their analysis into the archaeological interpretation of the site.

Shelves, cabinets, tables, and display cases are filled with artifacts. Rusty surgeon's scissors, a dental tooth extractor, cannon balls, shells, bells, fasteners, anchors, muskets, ceramic plates and bowls, mugs, locks and keys soak in Tupperware containers carefully filled with chemical compounds designed to stabilize the metals after more than a century of corrosion. Other items lie muffled in bubble wrap and Styrofoam, awaiting analysis and final preservation.

A 150-year old cannon from San Jacinto, the first U.S.-built screw ship and a veteran of the Civil War, soaks in a chemical bath in a rusted metal box. (Note: A screw ship is

a ship that is driven by a screw propeller.) On the bottom shelf of a wooden cabinet sits the blue and white porcelain toilet bowl from the infamous Confederate raider CSS Alabama, complete with its original flushing mechanism.

All together, the laboratory curates more than 2,500 artifacts and manages an international museum loan program of 6,200 artifacts. But not all artifacts are lucky

enough to end up at the Archaeology and Conservation Laboratory.

Many recreational scuba divers don't know or don't care about the laws protecting military wrecks. (See our sidebar entitled, "The Basics About the Sunken Military Craft Act.") In the 1960s, sports divers discovered the wreck of the Civil War steamer USS Tulip and quickly stripped more than 1,500 artifacts from the site. Worse, they disturbed the last resting place of the 49 men who died on Tulip when its boilers exploded on November 11, 1864 and whose bodies were never recovered. Worldwide, more than 18,000 sailors and

airmen died in the wrecks managed by the NHHC, and many of their bodies remain at the sites.

"It's important to remember that many of these sites are war graves," says Neyland, "and to give them the respect that they deserve."

Michiko Reynolds, an undergraduate intern from The George Washington University, has first-hand experience with the harm looting does to the preservation of artifacts. Sitting at a makeshift table in the UAB warehouse, Reynolds manually cleans the rust and corrosives from the wooden stock of a Civil War rifle recovered from looters of the Tulip. If the rifle had been treated as soon as it was recovered, it might have been in pristine condition. Now it's crumbling.



A cannon recovered from USS San Jacinto, the first U.S.-built screw ship, soaks in a chemical bath at the Navy Archaeology and Conservation Laboratory.



Navy archaeologist George Schwarz holds a metal and wooden dead-eye fastener recovered from the Patuxent wreck.



George Washington University intern Michiko Reynolds cleans rust from a rifle recovered from looters of USS Tulip.

"It's already dried out," Reynolds demonstrates, "so we won't be able to extract the salt, which means we won't be able to preserve it perfectly."

Artifacts from shipwrecks hold particular importance because they are often in pristine condition. Kate Morrand, Assistant Conservator, is cleaning and conserving a brass lantern from Tulip whose glass Fresnel lens is completely intact.

"It's not uncommon for artifacts from wrecks to be preserved intact," Morrand explains. And the metal and glass of this lantern have been particularly resistant to damage. "There's a bit of corrosion, but it's a lovely piece to work with."

Photos by Anne Siders.



Navy conservator Kate Morrand cleans a Civil War era lantern from USS Tulip that has remained perfectly intact for 200 years.



Underwater archaeologist Bradley Krueger examines a pair of surgical scissors recovered from the wreck.

CONTINUED FROM PAGE 10

- A set of carpentry tools may have belonged to Charles Fleming, the flotilla's carpenter who served on Scorpion.

By law, all shipwrecked Navy vessels remain property of the U.S. Navy in perpetuity. So, in 2011, underwater archaeologists from the U.S. Navy, the Maryland State Highway Administration, and Maryland Historical Trust dived again at the site, working in low visibility conditions to map out the dimensions of the wreck, assess its condition and stability, and perform preliminary excavations.

NHHC underwater archaeologist and principal investigator Dr. Robert Neyland hands a wooden artifact to NHHC underwater archaeologist Heather Brown.



Among the artifacts recovered were a second pair of surgical scissors, a stoneware jar still partially sealed with the original cork stopper, and the end of a corn cob. These seemingly mundane items tell archaeologists how Sailors lived and served on early Navy vessels. The stoneware jar may still contain trace amounts of its original contents, while a crude metal spiral is a vivid reminder of the early stage of dentistry at the time.

AS SOON AS ARTIFACTS LEAVE THE WATER, THEY FACE IMMEDIATE DANGER.

—GEORGE SCHWARZ

"The more artifacts we find, the more we can piece together a picture," Navy archaeologist Dr. Alexis Catsambis said.

Artifacts may be the key to identifying the Patuxent wreck and understanding the lives of these early Sailors, but they are also extremely vulnerable.

"As soon as artifacts leave the water, they face immediate danger," warned Schwarz. Exposure to air begins deterioration of materials that have survived two centuries underwater.

As soon as artifacts are found on the site, they are catalogued and sent to the NHHC Underwater Archaeology



Maryland State Underwater Archaeologist and principal investigator Dr. Susan Langley monitors surface screens for any artifacts dredged up from the site.



NHHC underwater archaeologists Dr. George Schwarz (left) and Dr. Alexis Catsambis prepare to dive on the shipwreck.

Barge components and equipment are pushed up the Patuxent River to the shipwreck site.





NHHC Underwater archaeologist Dr. George Schwarz and Richard Ervin, Maryland State Highways Administration, prepare to take measurements of the wreck.

Branch (UAB) where they can be treated and preserved for public display. Conservators at the labora-

tory examine, clean, document, and stabilize artifacts to prevent further deterioration through a combination of chemical procedures and extensive manual cleaning.

The value of the Patuxent wreck, whether it is or is not Scorpion, lies not only in the personal belongings believed to be on board, but also in the structure of the wreck itself.

Commodore Barney developed the structural concept of the gunboat barges that would serve in his flotilla, and even Scorpion, a Navy sloop, was re-designed and re-built for flotilla duty. As a result, no final design for Scorpion exists.

"We don't have much information on how these gunboats were built," Schwarz

said. "Other wrecks exist, but none are as well preserved as this one."

ONCE THE SHIP IS EXCAVATED, IT WILL BE CAREFULLY REBURIED TO PRESERVE ITS TREASURES FOR YEARS TO COME.

In preparation for the bicentennial celebration of the War of 1812, scheduled for 2012-2015, the NHHC's Underwater Archaeology branch and Maryland state officials are preparing for an elaborate reinvestigation of the fight. They are designing a cofferdam (a temporary watertight enclosure) to erect around the wreck to drain water away from it, excavating the site dry. This style of excavation will not only allow archaeologists greater access to the interior hull of the ship, but also open up the site to public viewing.

FOR MORE INFORMATION


For more information about NHHC, visit <http://www.history.navy.mil>.





A stretch of the Patuxent River near Upper Marlboro, MD in which is located the archaeological site of War of 1812 Chesapeake Flotilla shipwreck believed to be USS Scorpion.

Once the ship is excavated, it will be carefully reburied to preserve its treasures for years to come.

For more information, follow the search at <http://scorpionarchaeology.blogspot.com>. 

Photos courtesy of NHHC UAB, Department of the Navy.

CONTACTS

Robert Neyland
Naval History and Heritage Command
202-685-0897
robert.neyland@navy.mil

Anne Siders
Chief of Naval Operations
Energy and Environmental Readiness Division
617-233-5749
siders.anne@gmail.com



PVC piping placed in the sediment around the shipwreck delineate the extent of the vessel.

Evolution of the Navy's Industrial Radiological Controls Program

Today's Program Showcases Successful Remediation Actions,
New Instruction & Guidance

REMEDiation IS ALWAYS a complex process, but remediation of radiologically contaminated areas poses an especially difficult challenge. This challenge is being met by personnel from the Chief of Naval Operations Energy and Environmental Readiness Division's (N45) Radiological Controls (RADCON) Branch Office and their technical support centers as they support an immense cleanup effort at three California locations and generate new instructions and guidance to ensure the proper management of radioactive materials across the Navy.

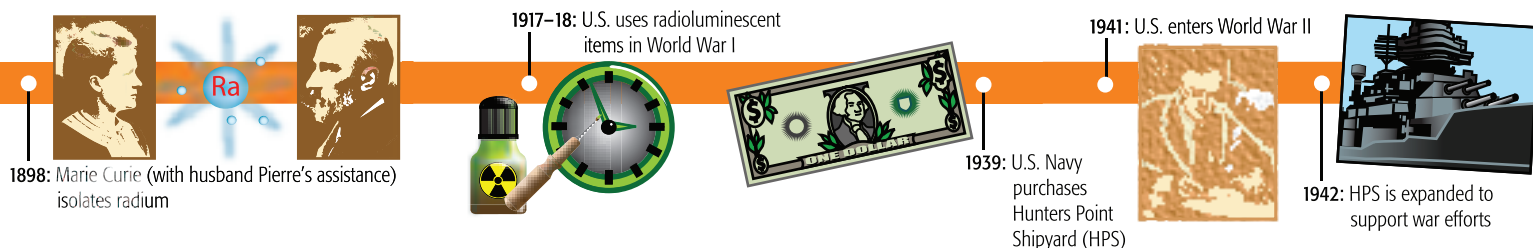
The largest of these cleanup efforts is taking place in the area once known as Hunters Point Shipyard (HPS), in south San Francisco. The site consists of 936 acres—493 on land and 443 under water in San Francisco Bay. The site was closed in 1994 as part of the Base Realignment and Closure (BRAC) program, and radiological contamination was discovered as environmental restoration activities were occurring on the grounds.

To assist with the radiological cleanup, a Navy contractor established a state-of-the-art on-site radiological laboratory,



Hunters Point.

© OpenStreetMap contributors



capable of screening for radioisotopes at extremely low levels to meet the very conservative remediation goals set for the shipyard. Over 87,000 soil samples and over 1,200 groundwater samples were analyzed for various types of radioactive materials. Using an on-site laboratory allowed soil samples to be turned around within 24 hours, as opposed to the 30 to 45 days it would take to get data back from an off-site laboratory. With powerful, near “real time” on-site laboratory capabilities, the Navy was able to make in-the-

acres remain to be transferred pending further environmental cleanup actions. (Note: For more information about BRAC, visit www.bracpmo.navy.mil.)

Radium's Early History

The situation at Hunters Point is far from unique. During the heyday of the radium era, disposal was not regulated and radioactive commodities were disposed of with the common trash. This means that just about

died. Soon radium was hailed as the cure-all, and a number of “health items” entered the market. These products ranged from radium suppositories to radium toothpaste, and included such items as a “radioendocrinator” to help male potency. These claims are still exploited in other parts of the world today.

Radium in the Services

When World War I started, the military needed to coordinate night operations,

Just about every landfill dating back from the early 20th century to the early 1970s could contain some type of radium devices.

field remediation decisions much faster and without the expensive mobilization/demobilization required by the radiological contractors.

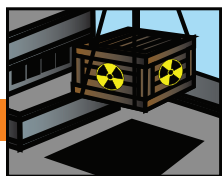
The Navy's largest removal action at HPS, which has been ongoing since 2006, involves removing over 34 miles of sanitary and storm drain sewer lines to deal with low-level radiation that was discovered throughout the system. Other actions include removing fuel pipelines, removing or reclaiming soil, and demolishing entire buildings. To date, approximately 65 percent of the radiologically impacted areas have been cleared through a process of excavation and disposal. Approximately 859

every military and commercial landfill dating back from the early 20th century to the early 1970s could contain some type of radium devices. Fortunately, the large majority of these devices have very small amounts of radioactivity.

The harmful effects of radium were not known for many years. In fact, shortly after Madame Curie isolated radium around the turn of the 20th century, there was a notable interest in the element and its implied medical uses. In 1903, Dr. Willy Meyer used radium to treat an incurable tumor, and it was observed to shrink and become less painful, though the patient ultimately

and started buying watches and other commodities that were radioluminescent.

In particular, the Navy bought thousands of deck markers. The deck markers were used to identify the edges of the piers, dry docks, and many areas in a ship, very similar to the bridge markers used by the Army. Additionally, many of the dials on a ship or in aircraft were radioluminescent. During World War II, personnel markers were added to the list of radioluminescent devices. These were clip-on devices that personnel would wear at night for better visibility. Also, gamma radiography began to be used



1945: Nuclear materials to support the atomic bomb are loaded onto USS Indianapolis at HPS

1946: Ships returning from Pacific nuclear weapons testing are decontaminated at HPS



1946: Naval Radiological Defense Laboratory (NRDL) is established at Hunters Point

1946: Atomic Energy Commission (AEC) is formed



1969: NRDL is disestablished



Sampling in soil screening yard.

With powerful, near “real time” on-site laboratory capabilities, the Navy was able to make in-the-field remediation decisions much faster.

as a control for quality assurance of welds. Medically, it was used to treat the sinuses of submariners who could not equalize during a dive.

One of the disadvantages of radium was that the energy of the alpha particle emitted during decay is very strong and ended up burning the zinc-sulfide that causes the luminescence. This meant that dials eventually lost their radioluminescence and had to be refurbished. The Navy set up radioluminescence dial shops at the Navy’s depots—now its Fleet Readiness Centers. Based partly on the experience of the “Radium Girls,” the Navy realized the problems associated with radium paint shops and issued regulations on the proper handling of the material. (For more information, read

our sidebar entitled, “The Radium Girls.”) However, these regulations were only effective up to a point since there were no disposal directions.

Managing Radioactive Devices

In 1946, the Navy played a large role in the development of the Atomic Energy Commission (AEC). The main purpose of the AEC was to transfer control of atomic energy into civilian hands. Ten years later, the Atomic Energy Act was passed, which included requirements for the management of radioactive materials. However, the instructions for disposal of radioactive materials was still somewhat vague and was restricted to “licensed facilities.” For example, in the late 1950s, one of the disposal plans sanctioned by the AEC included

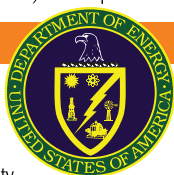
hiring licensed commercial boats or Navy ships to haul 55-gallon drums of radioactive waste out to sea, to be dumped overboard into deep water.

The Nuclear Era

As the Cold War accelerated and nuclear power plants came onto the scene, more and more radioactive waste was entering the air and water in myriad ways. It was clear to scientists (and to the public) that a new solution was needed. By the early 1960s, geologic storage was the accepted waste management strategy within the AEC for high-level radioactive waste (waste from nuclear power plants).

However, according to the U.S. Environmental Protection Agency (EPA)

1974: AEC is disbanded—Department of Energy and Nuclear Regulatory Commission (NRC) take its place



1982: The Nuclear Waste Policy Act is signed into law



1982: The Chief of Naval Operations establishes the Radiological Controls program office



1987: The Navy receives Master Materials License from NRC

1974: Navy ceases shipyard operations at Hunters Point
Mare Island shipyard continues using part of the facility



Sewer and storm drain removal.



Excavation awaiting backfill.

records, the AEC faced stiff resistance when they announced plans to locate an underground storage facility in an abandoned salt mine near Lyons, Kansas. This led to a long period of uncertainty about what to do with radiological waste.

When EPA was founded in 1970, the AEC's authority to issue generally applicable environmental radiation standards was transferred to EPA. In the mid-1970s, the AEC itself disbanded, splitting into two separate agencies—the Department of Energy (DOE) to handle research, and the Nuclear Regulatory Commission (NRC) to regulate the industry.

A decade or so later, the Nuclear Waste Policy Act (NWPA) of 1982 was passed. The NWPA assigned DOE the responsibility to site, build, and operate a deep geologic repository for the disposal of high-level waste and spent nuclear fuel. Today, this repository is located at Yucca Mountain, Nevada, but is not in use and there are current plans to close the site.

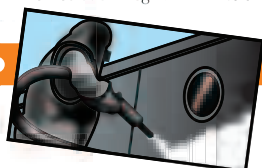
Also in 1982, Chief of Naval Operations Admiral James Watkins set up a coordinating office on radiological controls at the Office of the Chief of Naval Operations (OPNAV) level. The modern RADCON branch was born.

Due in part to the robustness of the industrial RADCON program, the NRC approached the Navy about becoming a partially self-regulating organization



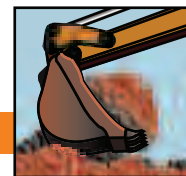
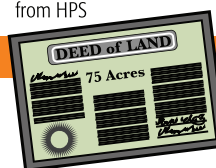
1988: HPS closes as part of Base Realignment and Closure (BRAC) program

1992: Remediation begins at Hunters Point



1997: Naval Air Station Alameda and Naval Station Treasure Island are closed due to BRAC

2004: First transfer of 75 acres from HPS



2012: Radiological remediation is in full swing at HPS, Treasure Island, Alameda and other bases affected by BRAC

The History of Hunters Point

IN 1941, JUST days after the Japanese attack on Pearl Harbor, the Navy took control of a ship repair facility known as Hunters Point, formerly leased to Bethlehem Steel. A series of quays, docks, and support buildings were built on an expedited wartime schedule at the facility to support the yard's mission of fleet repair and maintenance. A major expansion on the north side of the shipyard occurred during 1942 and 1943 when a submarine servicing facility consisting of dry docks and industrial and barracks buildings was completed.

In 1945, HPS served as the loading point for the radioactive materials used in the atomic weapons that were dropped on Hiroshima

and Nagasaki. The components were transported to a "safe house" at HPS, where they awaited the USS Indianapolis. The exact location of the "safe house" and the exact time the weapon components arrived has not been determined. Every security precaution was taken, including emptying all dry docks and berths at HPS.

Immediately after the end of World War II, the Navy used the expansive berthing facilities at HPS for reserve fleet ships returning from the Pacific. In 1946, this berthing was interrupted by the return of the Navy target and support ships from the two atomic tests conducted at Bikini Atoll in the South Pacific.



The return of these ships resulted in the creation of a special radiation safety office—the Naval Radiological Defense Laboratory (NRDL). In addition to handling radiological decontamination of these ships, the NRDL conducted research and experiments on radiological decontamination, the development of radiation detection instruments, and the effect of atomic weapons on living organisms, equipment, and vessels.

Throughout the 1950s and 1960s, HPS continued to operate as a shipyard. Its name was changed to Treasure Island Naval Station Hunters Point Annex after it went under BRAC. In 1974, the Navy ceased shipyard operations at HPS. From May 1976 to June 1986, Triple A Machine Shop, Inc. leased most of HPS from the Navy and operated these leased areas as a commercial ship repair facility.

Remediation at Hunters Point under BRAC began in 1992, when EPA signed a Federal Facilities Agreement with the Navy and the State of California to establish agreed upon requirements for environmental investigation and cleanup and ultimate transfer of the property to the City of San Francisco.

in 1984–5. In 1987, the Chief of Naval Operations Environmental Protection, Safety and Occupational Health Division (now the Energy and Environmental Readiness Division) received a Master Materials License from the NRC, granting it authority to train, inspect and certify others in the Department of Navy who handle and manage radioac-

tive materials from cradle-to-grave. Unlike the NRC, the RADCON program can operate wherever the Navy has a presence—be it on a ship at sea or a facility on foreign soil.

How RADCON Works

N45 is the resource manager for radiological control issues—they oversee

policy and provide management via the Naval Radiation Safety Committee. The program managers for RADCON are the Naval Sea Systems Command (NAVSEA) 04N Radiological Controls Office and the Navy Bureau of Medicine and Surgery (BUMED). NAVSEA 04N is in charge of industrial uses of radiological material. Technical



View of San Francisco.

support for this office comes from the NAVSEA Detachment, Radiological Affairs Support Office (RASO). BUMED helps regulate nuclear medicine, with technical support from the Navy and Marine Corps Public Health Center (NMCPHC). Both RASO and NMCPHC are staffed with inspectors and assist personnel who ensure that radiological equipment and materials are being used properly and that all safety precautions are being followed.

For any Navy office or facility to be able to handle radioactive materials, they must first apply for a Naval Radioactive Materials Permit (NRMP) from the Naval Radiation Safety Committee. (Note: The Naval Nuclear Propulsion Program and the Naval Nuclear Weapons Program are not covered by this program). This application insures that a command has the proper operating, training and emergency procedures in place for the safe use of radioactive materials.

The application must include, among other things, names of the person or persons to be held responsible, training plans, emergency preparedness plans, and a diagram of proposed storage facilities. The application is a lengthy interactive process between a technical support center and the applying command, which

lasts for several months (and up to a year) to review the training, operating and emergency procedures, inspect the facilities, and insure that all safety issues have been addressed. Once the committee is assured that the command is safe, they issue the NRMP, which allows a command to acquire and use radioactive materials.

The Radium Girls

THE WOMEN WHO worked with radium as watch-dial painters in the 1920s began to develop cancerous tumors, bone problems, and suffered painful amputations. Health workers learned that these women were instructed to lick their brushes while working to get a good point on the end of the brush for their detailed work. This resulted in them ingesting what often amounted to lethal quantities of radioactive compounds. The case of the "Radium Girls," which included workers from Ottawa, Illinois and Orange, New Jersey, made its way to the top of the country's legal system, reaching the U.S. Supreme Court in 1939. The women won a modest settlement and helped to shape U.S. labor law.

Source: *Voice of America* (www.voanews.com/content/radium-girls-remembered-for-role-in-shaping-us-labor-law-129169888/144746.html)



Time-critical removal action underway.

The NRMP is granted for ten years, and then it must be renewed, utilizing the same process (and same time frame) as applying for a new permit.

Inspectors from RASO and NMCPHC perform regular inspections of facilities and equipment that utilize radioactive materials. The period between inspections varies depending on the relative risk of the operation. Inspections are unannounced, and performed with the assistance of command management. According to the Naval Radiation Safety Committee Standard Operation Procedures manual, “The inspection will consist of observations of permittee operations, interviews with staff, and document review to supplement inspector observations. Radiation surveys will also be conducted. Emphasis should be placed on observing permittee performance as it relates to staff training, equipment operation, overall management of the permitted program, and integration of safety.” (For more details, see our sidebar entitled,

“The Naval Radiation Safety Committee Standard Operation Procedures.”)

Inspectors and permit reviewers must attend a minimum of five courses, as well as other courses in industrial or medical specialties as needed. In addition, they are

expected to read all applicable codes and regulations and participate in site visits. Refresher training is provided during periodic staff meetings. Finally, all inspectors and permit reviewers must complete at least 24 hours of formal training per year on such topics as environmental

The Naval Radiation Safety Committee Standard Operation Procedures Manual

AMONG OTHER DIRECTIVES, this manual outlines the standard operating procedures (SOP) for both the industrial and medical technical support teams. The section on inspections specifies the manner in which inspections are conducted. Basically, these consist of observation, interviews, document reviews, and independent and confirmatory measurements. The inspector then writes up a report—making sure to inform the Executive Secretary immediately if any Notices of Violation (NOV) are found. If NOVs are found, the command is given 30 to 60 days to respond regarding the root cause for the NOV, corrective steps that have been taken and results achieved, steps that will be taken to avoid future NOVs, and the date when full compliance is expected.

The manual discusses and classifies NOVs according to various severity levels, and outlines SOPs for each scenario. It also addresses repetitive violations and enforcement actions, which may include conferences with the permittee, and, in severe cases, revocation of the permit.



monitoring and modeling, dosimetry (radiation detection instruments), decommissioning, and regulatory updates.

Low-Level Waste Disposal

The Low-Level Radioactive Waste Policy Act of 1980 gives each U.S. state the responsibility to develop a method for disposing of its Low-Level Radioactive Waste (LLRW). LLRW is defined by the Atomic Energy Act of 1954 as “radioactive material that is not categorized as high-level radioactive waste, transuranic waste (waste containing artificially manufactured radioactive elements), spent nuclear fuel, or byproduct material,” and which the NRC classifies as LLRW.

To comply with this Act, the Department of the Navy (DON) formed its Low-Level Radioactive Waste Disposal Program. The DON LLRW Disposal Program provides a means to minimize the storage of unwanted DON radioactive material worldwide, reduce the potential for radioactive contamination and personnel radiation exposure, and ensure proper disposal of LLRW. All DON activities are required to dispose of LLRW through the DON LLRW Disposal Program. DON activities must submit requests for LLRW disposal to RASO who will then coordinate all disposals through Department of Defense LLRW Executive Agency in full compliance with federal and state regulations. Currently, there are four disposal sites for LLRW in the U.S.:

Implementation of Web Site Will Further Enhance RADCON Program

THE NAVY ENVIRONMENTAL Sustainability Development to Integration (NESDI) program initiated the development of a workflow database tool to further enhance the management and operation of the RADCON program. The new tool (called the Radiological Affairs Support Program Web tool or RASPWeb for short) will capture, manage, and track all data associated with RASP inspections and inventories; and issue, track, and archive voluminous NRMP correspondence and associated data.

Currently, all inspection, permitting, and inventory processes associated with RASP are tracked in a stand-alone Microsoft Excel-based management system that is cumbersome and inefficient, affords limited user access, and may be subject to common administrative errors. This approach incurs additional burden to Radiological Affairs Support Office (RASO) staff.

RASP management processes will be completely overhauled and workflow processes dramatically streamlined by implementing a secure, enterprise-wide, web-enabled database tool. Moreover, RASPWeb will be built off of the existing, proven framework of similar Navy web applications and database environments, working to leverage efficiencies by reducing both development time/cost and risk. The ultimate goal is for RASPWeb to replace everything feasible that is currently stored in physical hard copy format with an efficient, flexible framework that seamlessly manages workflow and correspondence, and is readily accessible to the Navy radiological user. Implementation of RASPWeb will enable RASO staff to maintain their core mission focus while ensuring a high degree of compliance with environmental rules and regulations.

Personnel from RASO and the Naval Facilities Engineering and Expeditionary Warfare Center are developing and validating the requirements for RASPWeb as part of NESDI project #495—the Radioactive Material Permit Generation, Management, and Tracking System.

For more information about the NESDI program, visit www.nesdi.navy.mil.





Sampling former isotope storage vault.

1. Clive, Utah
2. Grandview, Idaho
3. Richland, Washington
4. Andrews, Texas

To assist with LLRW disposal across DON, new instructions are being prepared by N45, and are expected to be released within the year. (Note: All Navy instructions can be downloaded from <http://doni.daps.dla.mil>.)

New Instruction on Licensed & Exempt Materials

N45 issued a recent instruction regarding the handling of generally licensed and exempt materials (OPNAVINST 6470.4). The purpose of the instruction—ACQUISITION, USE AND DISPOSAL OF CERTAIN NUCLEAR REGULATORY COMMISSION REGULATED RADIOACTIVE DEVICES AND SOURCE MATERIAL—is to establish Navy policy for the acquisition, use, and disposal of various categories of devices and material regulated by the NRC. These categories are as follows:

1. Exempt devices.

This refers to consumer devices not generally recognized to pose an unreasonable risk to human health and safety and includes such items as smoke detectors, self-luminous watches, and some rifle scopes.

2. Generally licensed radioactive devices.

These are devices manufactured and distributed under a specific license issued by the NRC or by an agreement state, and are deemed safe for use by personnel with no radiation safety training. Some examples include gas chromatograph units, static eliminators, luminous exit signs, and calibration or reference standards.

Screening Soil for Radioactive Components

DURING REMEDIATION, SOIL is tested for all sorts of contaminants. Typically, soil samples are scooped into premeasured compartments and tested for heavy metals, pesticides and polychlorinated biphenyls. Radium testing can be done in the laboratory, but because of the radioactive emissions, a different process is often used. At Alameda Point, all potentially contaminated soil is collected and dumped into a screening area the size of a tennis court, and graded smooth to a depth no greater than 12 inches. Then an electric vehicle with a scanning rig and Global Positioning System mapping system drives back and forth over every inch—at what the Alameda Environmental Office describes as “the pace of a turtle.” If any radiation is detected, it is mapped onto a computer, and the area is scooped up and placed in a LLRW bin. This is a time-consuming process, but it is very thorough. However, it is slowed even further when it rains since the process cannot take place when soil is wet.



Preparing discharge channel for survey.



Pickling tank demolition.

3. Generally licensed radioactive devices above a certain quantity.
Some of the materials that fall into category 2 have isotopes that equal or exceed a certain level. (The instruction specifies what the level is for various substances.) Navy and Marine Corps activities are prohibited from acquiring or using this material, except as authorized under a permit of the Naval Radiation Safety Committee.
4. 'Unimportant' quantities of source material.
Some examples include thoriated tungsten welding rods, depleted uranium counterweights in aircraft or rockets, magnesium-thorium alloys for aircraft engines, piezoelectric ceramics, vacuum tubes, thoriated lenses, and germicidal lamps. This material may be restricted in quantity.



Drydock 4 caisson.

The Basics About Uses of Radioactivity in the Navy & Marine Corps

AS IN THE rest of modern society, devices containing small amounts of radioactivity are common throughout the Navy and Marine Corps. Industrial radiography, for example, is used to X-ray aircraft and ships as part of routine inspection. Radiography is also used for package security inspections. Nuclear medicine employs radiation in many diagnostic tools such as X-ray and CT scan machines, teletherapy (use of an external beam radiotherapy), and irradiation to eliminate bacteria. Other examples of equipment capable of producing ionizing radiation include particle accelerators, electron microscopes, and laboratory analytical devices.

RASP covers these types of devices as well as commodities containing radioactive material such as:

- Electronic devices (electron tubes)
- Luminescent/self-illuminating devices (watches)
- Ionization devices (smoke detectors)
- Analytical devices (gauges)
- Items containing natural radioisotopes (aircraft/vehicle parts and welding rods)

5. Generally licensed source material, such as uranyl acetate used in electron microscopy and thorium dioxide used in crafting high quality lenses.

Navy and Marine Corps activities are prohibited from acquiring or using this material, except as authorized under a permit of the Naval Radiation Safety Committee.

Decommissioning & Remediation

The NRMP and the technical support offices are both managed by N45 through the Radiological Affairs Support Program (RASP). The RASP manual requires that each command maintain a detailed record of where all radioactive material is or has ever been stored, along with the type and amount of said material. These records “should identify areas where there is a reasonable likelihood that contaminants may have spread to inaccessible areas including seepage into porous materials such as concrete.”

A site may be decommissioned prior to the NRMP expiration, or if the command decides to permanently cease operations involving the use of permitted radioactive material. Decommissioning may apply to an entire facility or a single building.

The RASP manual describes the steps that must be followed during the decommissioning process. One of the first steps includes conducting a Historical Radiological

Assessment (HRA) to determine the location and level of radioactive contamination remaining in the facility or area.

The guidelines for a Navy HRA are equivalent to the guidelines for a Historical Site Assessment that were established in the Multi-Agency Radiation Survey and Site Investigation Manual. Through research, interviews and site visits, an HRA is prepared that will document, refine and expand the record of historical radiological activities at the facility. For BRAC sites, the HRA is used to facilitate transfer of the property for civilian redevelopment. Information for the HRA comes from record searches, interviews, and site visits regarding locations where radioactive materials may have been used, stored, or disposed.

The HRA for Hunters Point, for example, covered 882 historical and current sites and support areas. Of these, 91 were identified as radiologically impacted to some degree.

If needed, the facility will be required to develop a decommissioning plan to remove residual radioactive contamination to levels prescribed by NRC regulations. The plan is required to include:

- Current radioactive contamination levels at the site
- The criteria for the final condition of the site
- A process to remediate existing radioactive contamination not currently authorized by the NRMP (if applicable)
- Procedures to protect workers performing decontamination
- Decommissioning cost estimates
- The final survey method to demonstrate compliance with NRC release criteria
- A schedule for remediation activities and NRMP termination

Concrete-encased pipe awaiting survey.



Furnace demolition.



If naturally occurring radiation is found, remediation proceeds following the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) model. Commonly known as Superfund, this process involves a preliminary assessment, a feasibility study, records of decision, a remedial plan, construction and post-construction phases, and a plan for site reuse or redevelopment.

If licensed radioactive material is found, cleanup proceeds according to NRC rules. In the case of Hunters Point, both types of radiation were found. To avoid duplicative efforts, the NRC agreed to review the documents generated under CERCLA for compliance with their regulations.



Gun mole crane.

What is Radiation?

RADIATION IS ENERGY in the form of waves or moving subatomic particles, occurring naturally or in manmade form. Some naturally occurring sources of radiation are our own atmosphere, our soil, water and vegetation. Manmade sources of radiation include televisions, medical machinery (such as X-rays), and linear accelerators.

Ionization is the process by which an atom or molecule changes into an ion—a particle with a net positive or negative electrical charge. Ionization occurs when there is an imbalance between the total number of electrons and the total number of protons. Ionizing radiation has enough energy to excite and remove electrons when it comes in contact with other matter. Enough ionizations can be destructive to biological organisms.

Types of ionizing radioactivity include:

- Alpha and beta particles (both of which are easily stopped by air or cloth and difficult to detect)
- Gamma rays
- Neutron particles (which rarely occur naturally and are also difficult to detect)

Other Impacted Sites

The former Naval Station Treasure Island California is also undergoing remediation. Treasure Island is a man-made island located in the middle of San Francisco Bay, and was constructed from dredged sediments for inclusion in the 1939 Golden Gate International Exposition. The Navy, which operated a base on adjacent Yerba Buena Island, acquired Treasure Island in 1942. The island became a major naval facility during World War II, processing approximately 12,000 outgoing and incoming military personnel per day. It was closed in 1997.

The Navy has been working with the State of California for more than 20 years under a consultation framework established by a 1992 Federal Facilities Site Remediation Agreement to protect human health and the environment.

According to the Navy's BRAC web site (www.bracpmo.navy.mil), an HRA was conducted for Treasure Island in 2006, which assessed 542 historical and current sites (buildings, structures, and open areas). Eighteen sites were identified as requiring further review. Of those 18 sites, five sites were designated as "impacted." Radium-226 was found in one area—the former bunkers. All impacted soil from this area has now been screened and properly disposed of. New work has identified radium in three other areas and their associated drain systems. Remediation is ongoing at these areas.

The Navy is working on a supplemental Technical Memorandum to the HRA in August 2012 to identify additional areas on the installation that may require further evalua-



WA 17 almost complete.

tion for radiological contamination. All continuing radiological response actions are being undertaken in cooperation with the State of California.

N45 is also overseeing radiological remediation efforts at the former Naval Air Station Alameda, California, commonly known as Alameda Point. Alameda Point, located immediately southwest of Oakland, contains a

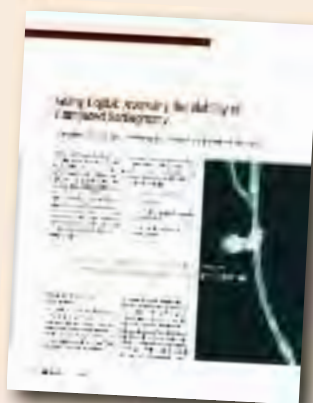
National Register eligible World War II Historic District and is currently a host to the USS Hornet museum via lease to the City of Alameda.

The Navy did extensive soil testing at Alameda Point over the years. An HRA was performed at Alameda Point and it concluded that of the 685 historical and current sites, 23 were designated as potentially impacted. Surveys have since confirmed contamination in seven locations, which include four sites, two buildings and the drain lines from these two buildings. Remediations have been performed and characterization surveys have confirmed the need for further surveys/remediations within two buildings.

Whether it's limiting the use of radioactive materials, ensuring that personnel are using them safely, or aiding in the remediation of contaminated soil and water, RADCON is dedicated to supporting the Department of Defense's mission while safeguarding the health of Sailors, Marines, Soldiers and civilians. [Anchor icon](#)

For More Information

FOR MORE INSIGHTS into the Navy's use of radiography, see our story in the fall 2012 issue of *Currents* entitled, "Going Digital: Assessing the Viability of Computed Radiography." To subscribe to the magazine or browse the *Currents* archives, visit the Department of the Navy's Energy, Environment and Climate Change web site at <http://greenfleet.dodlive.mil/currents-magazine>.



CONTACT

Lino Fragoso
Chief of Naval Operations Energy and Environmental Readiness Division
703-695-5272
DSN: 225-5272
lino.fragoso@navy.mil

The Art of the Long View

Highlights from the 2012 Naval Energy Forum

ON 17 OCTOBER 2012, the 4th annual Naval Energy Forum took place in Washington, DC. The event brought together a dynamic group of senior military, industry, non-government organization, and Congressional leaders to discuss recent challenges,

energy program, was among the hundreds in attendance.

In her remarks, Senator Shaheen urged the Navy to continue moving forward, citing the connection between energy and national security.

“Energy security...is imperative to the success of today’s military, and it becomes more critical with each passing generation. So let’s be clear: energy security is national security,” said Senator Shaheen.

No one has ever gotten anything big done by being timid.
We have seen that the biggest changes have come when
every Sailor and Marine buys into the idea of energy conservation.

—Ray Mabus, Secretary of the Navy

successes, and the way ahead for achieving the Secretary of the Navy’s energy goals. Presenters shared their perspectives in various energy focus areas including expeditionary, aviation, maritime, shore, international, and industry.

Secretary of the Navy (SECNAV) Ray Mabus, Senator Jeanne Shaheen (D-New Hampshire), Ms. Sharon Burke (Assistant Secretary of Defense for Operational Energy Plans and Programs), and Vice Admiral Philip H. Cullom (Deputy Chief of Naval Operations for Fleet Readiness and Logistics) were among the event’s headliners. Senator John Warner, a staunch supporter of the Navy’s



Secretary of the Navy Ray Mabus gave the keynote address at the forum, highlighting the Department’s progress toward the aggressive energy goals he laid out in 2009.

Katherine Turner

The overarching theme, “The Art of the Long View,” highlighted the importance of using energy in a judicious manner to enhance combat capability and ensure the availability of resources for future generations. Maintaining and increasing operational capabilities and culture change were themes that resonated throughout the various presentations.

SECNAV Ray Mabus emphasized the importance and challenges of change and reminded participants that, “Bold steps are part of our nature as Americans. And it’s part of what makes us a great nation. No one has ever gotten anything big done by being timid. We have seen that the biggest changes have come when every Sailor and Marine buys into the idea of energy conservation.”

Remarks by Ms. Sharon Burke underscored the importance of energy efficiency and the challenges the Navy faces to build a stronger future force. “We can’t pretend energy is a commodity when we need it, where we need it. We have to value it,” she said.

Some key takeaways from the various sessions at this year’s forum are summarized below.

Expeditionary

Energy efficiency can increase agility and help maintain the competitive edge of the boots-on-the-ground Marine. Technologies such as the Solar Portable Alternative Communications Energy System (SPACES) and the Ground Renewable Expeditionary Energy Network System (GREENS) deployable solar systems, along with rechargeable battery packs enable Marines to meet their energy requirements in the field. Carrying fewer batteries frees up pack space and reduces weight to enable Marines to carry additional ammunition. The Marines have embraced these technologies, and young Marines understand energy efficiency as the new way ahead. Lieutenant General Richard Mills (Deputy Commandant for Combat Development and Integration) explained that, “Energy inefficiency is just simply inconsistent with the Marines’ current and future operational concepts and the environments in which they’re going to have to fight... [we] use fuel efficiency and fuel consciousness to make the force more versatile; have more fight in it, and more ready to respond to threats as they arise.”

Naval Aviation

Across the naval aviation community, initiatives are underway to reduce energy consumption. Improvements



Senator Shaheen reiterated the need for Navy’s energy initiatives for maintaining energy security and the capability of our military forces.

Katherine Turner



Rear Admiral Kevin Slates, Director of the Chief of Naval Operations Energy and Environmental Readiness Division, served as master of ceremonies for the event.

Katherine Turner



Marines have used the GREENS system, which generates electricity through solar power, to power command operation centers in Afghanistan.
Sgt. Richard Blumenstein

Energy inefficiency is just simply inconsistent with the Marines' current and future operational concepts and the environments in which they're going to have to fight.

—Lieutenant General Richard Mills, U.S. Marine Corps

in naval aviation simulators and modification of fuel use during training flights can reduce fuel demands and achieve major savings. Naval pilots must be fully prepared to operate aircraft at maximum speed and performance parameters, but also use best judgment to conserve fuel when feasible. For this approach to be successful, the organization needs to ensure it has the right policies and technologies in place, makes the appropriate assumptions at the time of acquisition, and has the awareness and willpower to create a culture that accepts these changes.

"We ought to pay attention all the time to how we use those resources so that we aren't wasting, even in a time when we do have the excess capacity," said Vice Admiral (VADM) David Dunaway, Commander of Naval Air Systems Command. "Why burn it if you don't need to?"

Maritime Initiatives

As more powerful shipboard systems come on line, energy saving technologies will be critical for maintaining lower energy profiles and staying within fuel budgets. Maritime energy saving initiatives, such as energy

dashboards, stern flaps, and solid state lighting, can decrease energy consumption and improve combat capability by allowing ships to travel farther on a gallon of fuel. Other maritime programs, such as the Hybrid Electric Drive and the High Efficiency HVAC, are improvements to existing shipboard technologies that help with fleet readiness and also decrease ships' energy consumption. In an anecdote about the USS Makin Island (LHD 8), the Navy's first hybrid electric drive ship, SECNAV explained how providing this platform for Sailors has helped to instill a culture of energy awareness.

“What was really going to count were those young Sailors and Marines buying into this and coming up with their own ideas,” said SECNAV. “This is the future of ship-board energy innovation.”

Shore

Smart meters have been installed at 90 percent of naval shore installations globally, providing real time data to building users that allows them to identify areas of high energy use and make changes in their everyday activities to conserve energy. These improvements provide installation users with tangible examples of how alternative energy and energy efficiency relates to their everyday lives. By bringing these controls to the user and making energy a part of the conversation, the Navy is creating a culture of energy awareness and savings. Rear Admiral (RDML) Patrick Lorge (Commandant of Naval District Washington and Deputy Commander for Joint Forces Headquarters, National Capital Region) said the shore community “...want[s] to increase that shore energy security; reduce...energy consumption; increase that efficiency; and find ways to inject renewables...and also alternative sources; and provide that reliable energy for that critical infrastructure.”

Acquisition

The fully burdened cost of energy and the future energy costs of new systems are factors now being considered earlier and more aggressively during the acquisition process. This represents a significant change in how acquisition budgets and contracts have historically been written. VADM William Burke, Deputy Chief of Naval Operations for Warfare Systems (OPNAV N9) used the



Colonel Bob Charette, Director of the U.S. Marine Corps' Expeditionary Energy Office, explained the need to correlate energy efficiency with combat capability.

Katherine Turner



Sir Richard Branson, founder of Virgin Group, underscored the importance of the military's steps towards achieving energy independence in a prerecorded video message.

Katherine Turner

example of a nuclear submarine to illustrate the concept. A docked nuclear submarine hooks into a shore facility's electrical grid, drawing electricity to power its lights and systems. By ensuring that the most energy efficient systems are installed on the submarine at the acquisitions phase, the system's long-term energy costs will be lower.

support for international navies is maximized, is critical in ensuring mobility and continuity at sea. The U.S. Navy has an opportunity to contribute to the discussion on the international fuel standard, as it demonstrated during the 2012 Rim of the Pacific exercise when an Australian Sea Hawk helicopter was fueled with a 50/50 biofuel/jet fuel blend.

and sense of urgency about ending our dependence on oil. U.S. military and commercial aviation are working together to test and to certify other types of renewable jet fuels." Partnerships between Navy and industry are pivotal to resolving technical hurdles and eventually achieving economies of scale for alternative fuels.

If Americans don't invest in figuring out how to produce renewable fuels at-scale, and then invest in the infrastructure needed to produce billions of gallons, we will be in a world of hurt."

—Mr. Mike Ritzenthaler, Piper Jaffray

VADM Burke went on to discuss the relationship between energy budgets and the maintenance and continuity of the fleet, explaining that energy savings translate directly to operational improvements. "What's the imperative for reducing energy costs? [The Navy] spends almost five billion dollars on fuel each year...it is important to know that the percentage of the cost for us of fuel, relative to the budget, has grown significantly...If we saved just one percent of what we spend on fuel, we could do a significant maintenance availability on a destroyer. If we could save ten percent, we could buy a new Littoral Combat Ship or Mobile Landing Platform."

International Perspective

The international panel, representing Australia, the North Atlantic Treaty Organization, and Denmark, reiterated the need for change. A takeaway was that global flexibility, where interoperability and compatibility in logistical

"We are very motivated in cooperation...to bring down the cost, and also to get the equipment...because the priority number one for all of us is the security of the single individual that we send out in harm's way," said Lieutenant Colonel Per Lyse Rasmussen, Danish Army, Assistant Defense Attaché at the Danish Embassy.

Industry Perspective

A highlight of the industry panel was a videotaped presentation by Sir Richard Branson, founder of Virgin Group. Mr. Branson expressed the importance of collaboration and the necessity to invest today to enable payoffs in the future. Mr. Branson demonstrated the similarities between his energy vision and the U.S. Navy's, stating that, "We have a shared vision

The panel discussed examples of collaboration among the Navy, industry (including the aviation and shipping industries), and other U.S. government agencies (Department of Energy; Department of Agriculture) to advance the commercialization of biofuels. Panelists stressed



Ms. Sharon Burke, Assistant Secretary of Defense for Operational Energy Plans and Programs, discusses the importance of energy efficiency, renewable energy, and alternative fuels.

Katherine Turner



VADM Philip H. Cullom, Deputy Chief of Naval Operations for Fleet Readiness and Logistics, reminded the audience at the 2012 Navy Energy Forum that to meet the energy security challenges we face, the Navy and the Marine Corps must maintain a vision of the long view.

Katherine Turner


Partnerships between Navy and industry are pivotal to resolving technical hurdles and eventually achieving economies of scale for alternative fuels.

the importance of investing in the future to be able to react to the politics and economics of energy. As panelist Mr. Mike Ritzenthaler, Senior Research Analyst, Piper Jaffray, stated, “If Americans don’t invest in figuring out how to produce renewable fuels at-scale, and then invest in the infrastructure needed to produce billions of gallons, we will be in a world of hurt.”

Conclusion

In his closing remarks, VADM Cullom reminded the audience that to meet the energy security challenges we face, the Navy and the Marine Corps must maintain a vision of the long view. Enhancing combat capability and using energy in a judicious manner involves changing the way we view energy. If we do that successfully, we can improve operational capabilities across multiple platforms and reduce energy consumption afloat and ashore. VADM Cullom reiter-

ated the Chief of Naval Operations’ sailing directions—war fighting first; operate forward; be ready. He added, “Energy is woven throughout every single piece of that.”

Additional event photos can be found online at www.facebook.com/navalenergy. More information about the 2012 Naval Energy Forum can be found online at <http://www.ndia.org/meetings/3600/Pages/default.aspx>. To learn more about the Navy’s energy program, visit www.greenfleet.dodlive.mil. 

Art of the Long View poster designed by Lacey Olivares.

CONTACT

Andrea Lamartin
Chief of Naval Operations Energy and Environmental Readiness Division
703-695-5071
DSN: 225-5071
andrea.lamartin1.ctr@navy.mil



Naval Energy Forum **Art of**



2012
the Long View



Two Award Programs Recognize Navy & Marine Corps Energy & Water Saving Achievements

Back-to-Back Ceremonies Celebrate Winners in SECNAV Energy and Water Awards & FEMP Energy and Water Management Awards

OCTOBER WAS NATIONAL

Energy Action month and several individuals, teams and installations from the U.S. Navy and U.S. Marine Corps (USMC) were honored for their energy and water saving actions. Two different programs bestowed awards at their respective ceremonies—the Secretary of the Navy’s (SECNAV) Energy and Water Awards (held 3 October 2012) and the Federal Energy Management Program’s (FEMP) Energy and Water Management Awards (held 4 October 2012).

Energy Intensity, Water Intensity—What Do They Mean?

ENERGY AND WATER conservation progress each are tracked by units of energy or water used per measure of building space. For energy, the intensity metric is million British thermal units of energy (MBtu) per thousand square feet (KSF) of building space. Similarly, water progress is measured as thousand gallons (KGAL) per thousand square feet.

Secretary of the Navy Energy and Water Management Awards

With its SECNAV Energy and Water Management Awards, the Department of the Navy (DoN) recognizes outstanding commitment to energy and water management by Navy and Marine Corps installations, ships and squadrons.

SECNAV Awards are presented to those commands that have made notable progress toward DoN goals to reduce energy and water consumption, increase use of renewable energy sources, and construct sustainable facilities. The DoN Energy Program evaluates and classifies the overall energy and water management performance of each installation, ranking them according to a system of SECNAV winner, platinum, gold or blue level of achievement. The 2012 awards recognized achievements from Fiscal Year (FY) 2011.

The 2012 SECNAV Award recipients, the highest-ranking commands in each of eight categories, are presented by category.

Navy Large Shore Installation

Joint Base Pearl Harbor-Hickam, Hawaii (JBPHH)

JBPHH achieved energy reduction exceeding the FY 2003 baseline goals, despite inheriting 4,450 thousand square feet of Air Force facilities. Projects JBPHH instituted in FY 2011 included solar photovoltaic (PV), ocean



CAPT. Jeff James, Joint Base Pearl Harbor-Hickam Commander, and members of the JBPHH energy team.



Photovoltaic panels at JBPHH.

thermal energy conversion, wave energy buoy, seawater air conditioning, and wind and medium temperature geothermal resources. The PV projects included the largest rooftop solar PV in Hawaii, installing 2.5 megawatts of PV arrays on five base facilities. JBPHH also awarded the first ever Joint Service Solar Multiple Award Contract to construct a 10 + megawatt PV array, creating the first Navy 'Net X' community—exporting more energy than it consumes.

Navy Small Shore Installation

Naval Air Station (NAS) Sigonella, Italy

NAS Sigonella reduced energy intensity by 25 percent from the FY 2003 baseline, and water intensity by 20 from the FY 2007 baseline. Energy and water projects included PV, xeriscaping, water reclamation, and solar thermal hot water systems. Four new facilities achieved or exceeded the professional standards of two different organizations:

1. Leadership in Energy and Environmental Design Silver (LEED) Silver requirements
2. 30 percent or more below the American Society of Heating, Refrigeration, and Air-Conditioning Engineers energy baseline

A monthly energy board meeting, attended by the Regional Commander, contributed to base energy awareness and reduction efforts.

Naval Air Station Sigonella's Utilities and Energy Management energy team with photovoltaic carport.





Team members from the Camp Pendleton Box Canyon photovoltaic development team at the Box Canyon site.

Marine Corps Small Shore Installation

Marine Corps Logistics Base (MCLB) Albany, Georgia

MCLB Albany reduced energy intensity by 19 percent compared to the FY 2003 baseline. The primary energy consumer is the Maintenance Center, which serves to rebuild and repair combat support equipment. Utilizing the combination of a Power Purchase Agreement to acquire methane gas and an Utility Energy Service Contract (UESC) to install infrastructure and equipment, 1.9 megawatts of renewable electricity generation went on-line. Throughout the base, management and control system



Photovoltaic system at Camp Pendleton.

efficiency and installing metering capabilities. This includes a \$5 million Utility Energy Service Contract (UESC) delivery order awarded in FY 2011.

A notable PV installation at Camp Pendleton's Box Canyon Landfill, which contributed to these accomplishments, was recognized by a FEMP award, summarized later in this article.

Overall, NAS Sigonella saved 31 billion Btus and avoided \$35 million in costs.

These accomplishments also were recognized by the FEMP award for individual achievements in FY 2011, summarized later in this article.

Marine Corps Large Shore Installation

Marine Corps Base Camp Pendleton, California

Camp Pendleton improved facility operations and increased renewable energy generation on site using energy management strategy targets. The base reduced energy intensity by 20 percent relative to the FY 2003 baseline. During FY 2011, construction of multiple PV systems increased on site renewable energy capacity to 4.5 megawatts. Over the past decade, Camp Pendleton has invested over \$50 million towards improving energy



MCLB Albany's Landfill Gas-to-Energy generator produces 1.9 megawatts of renewable electric power and steam by burning landfill gas collected from the Gaissert Road Dougherty County Landfill. MCLB Albany, Chevron and local officials flipped the switch 23 September 2011. The new green technology is the first of its kind within the Department of the Navy.

As part of the ESPC, geothermal heat pumps were installed to use the earth for heating and cooling NUWC Keyport buildings.

Pat Hardesty



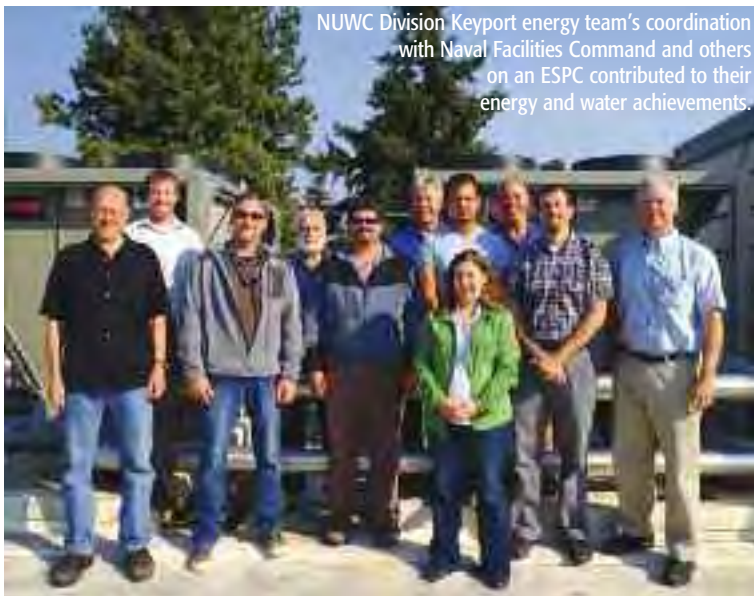
upgrades for buildings provide better control of heating and cooling systems. Lighting upgrades such as high output T8 fluorescent lights, occupancy sensors, and day lighting improve energy efficiency and lighting quality.

MCLB Albany also was recognized by a FEMP award, summarized later in this article.

Other Shore Installation

Naval Undersea Warfare Center (NUWC) Division Keyport, Washington

NUWC Division Keyport achieved a 40 percent energy reduction from the FY 2003 baseline. The installation went from a 20 percent reduction in FY 2010 to its current 40 percent reduction in FY 2011, doubling the achievement in one year. Some of FY 2011 accomplishments include facility efficiency improvements such as heating and cooling system upgrades, lighting upgrades, as well as boiler replacements that accounted for \$1.4 million in cost avoidance. Additionally, the installation achieved 25 percent water usage reduction by implementing the full suite of best water management practices.



NUWC Division Keyport energy team's coordination with Naval Facilities Command and others on an ESPC contributed to their energy and water achievements.

These achievements also were recognized by a FEMP award, summarized later in this article.

Large Ship

USS Makin Island (LHD 8)

USS Makin Island saved more than 17,000 barrels of fuel in FY 2011 compared to its established historical average fuel usage. This accomplishment is the direct result of command commitment to energy efficiency and ship-wide implementation of Naval Sea Systems Command's



Members of the USS Makin Island energy-saving crew.

(NAVSEA) Incentivized Energy Conservation (iENCON) energy strategies, techniques and training. The use of Ship Energy Conservation Assist Training (SECAT) software and meticulous transit planning greatly enhance operational efficiency. Proactive tools, including Spotlight and Zone Inspections and hourly tracking of potable water usage and production, ensure excessive energy and water usage are aggressively investigated and immediately corrected. Additionally, Makin Island reduces potable water consumption for washing landing craft air cushions by 75 percent.



USS Makin Island (LHD 8).
MC2 Oscar Espinoza

Medium Ship

USS Philippine Sea (CG 58)

USS Philippine Sea saved nearly 35,000 barrels of fuel in FY 2011 compared to the CG class average fuel usage. As one of the top 25 performing ships, Philippine Sea uses NAVSEA iENCON fuel management practices and techniques, as well as SECAT soft-

ware to increase energy efficiency. Philippine Sea actively implements measures to reduce fuel consumption. During the Atlantic transit to Mayport, Florida, Philippine Sea successfully avoided refueling operations through careful planning and conducting ammunition offload in Yorktown, Virginia. The shipboard comprehensive energy awareness and training program includes iENCON training during Indoctrination, Plan of the Day, and engineering departmental training.

USS Philippine Sea (CG 58).
MC3 Nicholas Hall



USS Philippine Sea energy engineering crew members.



USS Klakring (FFG 42).
MC2 Robert A. Wood Sr.



USS Klakring's Commander Canady and members of the energy team.

Small Ship

USS Klakring (FFG 42)

USS Klakring saved 3,258 barrels of fuel in FY 2011 compared to the FFG class average fuel usage. Using a state-of-the-art engineering console trainer and simulations, Klakring capitalized on every opportunity to conduct engineering drills while in port to minimize fuel consumption. During the Pilot Training Program Cycle, Klakring reduced fuel consumption by using optimal transit lanes and speeds, compressed night steam boxes (a reduced size operational area where the ship stays while not under tasking for the evening), and limited dual engine speed runs. Klakring leadership is committed to implementing NAVSEA's iENCON program focusing on energy awareness and training. Utilizing tools from the iENCON Guide, iENCON website and checklist, daily Plan of the Day notes, and shipboard public address announcements, Klakring successfully creates an energy culture from top to bottom.

These SECNAV Award-winning commands executed comprehensive energy and water management programs with senior-level command involvement, well-staffed and trained energy teams, aggressive awareness campaigns, innovative energy and water efficiency measures, attention to using renewable energy, and consistent reduction in energy and water consumption. The award winners receive the privilege of flying the SECNAV Energy flag for one year and receive a cash award.

The Platinum level of achievement recognizes an outstanding energy program and an exceptional year for energy project execution. Commands

receiving the Platinum achievement designation are recognized at the SECNAV Energy and Water Awards ceremony and each receive a \$5,000 cash award. Ten commands were recognized at the Platinum level for 2012:

1. Naval Support Activity Panama City, FL
2. Naval Station Newport, RI
3. Naval Magazine Indian Island, Port Hadlock, WA
4. Naval Air Station Whidbey Island, WA
5. Marine Corps Air Ground Combat Center Twentynine Palms, CA
6. Marine Corps Recruit Depot Parris Island, SC
7. Marine Corps Support Facility Blount Island, Jacksonville, FL
8. USS Bataan (LHD 5)
9. USS Paul Hamilton (DDG 60)
10. USS ELROD (FFG 55)

Federal Energy Management Program Energy and Water Management Awards

The Federal Energy and Water Management Program (FEMP), a program within the U.S. Department of Energy, works to support Federal agencies in pursuit of their legislated and executive-ordered energy, greenhouse gas, and water goals. The program includes the FEMP Energy and Water Management Awards.

The FEMP awards recognize Federal employees, along with their private sector partners, who successfully develop and implement cost-efficient projects and programs that go above and beyond the federal government's water, energy and fleet management goals. One goal of the awards is to help other agencies and offices leverage best practices and lessons learned to successfully complete their own energy and water efficiency projects. Nominations for the 2012 awards were evaluated within eight categories:

Gold Awards for Outstanding Energy Programs

GOLD LEVEL OF achievement indicates a very good to outstanding energy program. The 2012 Gold level commands, which receive a certificate of achievement, are:

1. Commander Fleet Activities Sasebo, Japan
2. Commander Fleet Activities Yokosuka, Japan
3. Fleet Readiness Center Southwest, San Diego, CA
4. Joint Expeditionary Base Little Creek-Fort Story, Norfolk, VA
5. Marine Corps Air Station Beaufort, SC
6. Marine Corps Air Station Miramar, San Diego, CA
7. Marine Corps Air Station Yuma, AZ
8. Marine Corps Base Hawaii
9. Marine Corps Base Quantico, VA
10. Marine Corps Recruit Depot San Diego, CA
11. Naval Air Facility Atsugi, Japan
12. Naval Air Facility El Centro, CA
13. Naval Air Station Fort Worth Joint Reserve Base, TX
14. Naval Air Station Jacksonville, FL
15. Naval Air Station Kingsville, TX
16. Naval Air Station Lemoore, CA
17. Naval Air Station Oceana, Virginia Beach, VA
18. Naval Air Station Pensacola, FL
19. Naval Air Weapons Station China Lake, CA
20. Naval Base Coronado, San Diego, CA
21. Naval Base Guam
22. Naval Base Kitsap, Bremerton, WA
23. Naval Base Point Loma, San Diego, CA
24. Naval Base Ventura County, Point Mugu, CA
25. Naval Construction Battalion Center Gulfport, MS
26. Naval Facilities Engineering Command Southwest, Reserve Component Command, San Diego, CA
27. Naval Station Everett, WA
28. Naval Station Great Lakes, IL
29. Naval Station Guantanamo Bay, Cuba
30. Naval Station Mayport, FL
31. Naval Station Norfolk, VA
32. Naval Station Rota, Spain
33. Naval Submarine Base Kings Bay, GA
34. Naval Support Activity Andersen, Guam
35. Naval Support Activity Hampton Roads, Norfolk, VA
36. Naval Support Activity Mechanicsburg, PA
37. Naval Support Activity Mid-South, Millington, TN
38. Naval Support Activity Monterey, CA
39. Naval Support Activity Naples, Italy
40. Naval Support Activity Orlando, FL
41. Naval Support Activity Souda Bay, Greece
42. Naval Support Activity, Bahrain
43. Naval Surface Warfare Center Carderock Division, Bethesda, MD
44. Naval Surface Warfare Center Ship Systems Engineering Station, Philadelphia, PA
45. Naval Weapons Station Earle, Colts Neck, NJ
46. Naval Weapons Station Seal Beach, CA
47. Pacific Missile Range Facility Barking Sands, Kekaha, HI
48. Portsmouth Naval Shipyard, Kittery, ME
49. USS Bonhomme Richard (LHD 6)
50. USS Lake Champlain (CG 57)
51. USS Thach (FFG 43)



- Contracting
- Exceptional Service
- Individual Fiscal Year 2011 Achievements
- Program
- Project
- Better Buildings (Fiscal Year 2011)

The Navy and USMC received nine of the 33 awards at the FEMP awards ceremony, a notably strong showing. Their award-winning work is summarized below.

Contracting

Charles Benson

U.S. Department of the Navy
Naval Facilities Engineering Command (NAVFAC) Northwest
Silverdale, Washington

Charles Benson has played an instrumental role in awarding nearly \$34 million in UESC projects and energy services for NAVFAC Northwest. When contracting authority for the energy program transferred to NAVFAC Northwest in 2006, Mr. Benson was assigned responsibility for implementing two new UESC basic ordering agreements between the Navy, Puget Sound Energy, and the



Navy and Marine Corps winners at the Federal Energy Management Program's Energy and Water Awards ceremony, 4 October 2012.

Bonneville Power Administration. With no prior UESC experience, Mr. Benson took the initiative to learn about the program, navigate the approvals process, and educate his superiors in order to implement the contracts. Having become the Navy's Northwest Region expert for UESCs, Mr. Benson has also mentored other contracting specialists in UESCs ensuring NAVFAC Northwest's maintains a strong commitment to energy efficiency, water conservation, and renewable energy projects far into the future.

Exceptional Service

Dan Magro

U.S. Department of the Navy
Naval Facilities Engineering Command Engineering Service Center (now the Naval Facilities Engineering and Expeditionary Warfare Center)
Port Hueneme, California

Dan Magro has worked in the Navy's energy and water program for 17 years and since 1997 he has coordinated nearly \$189.2 million in energy conservation investment program projects and has implemented \$280.5 million in ESPCs.

Together these projects have resulted in lifecycle energy savings of more than three trillion Btu, water savings of 560 million gallons, and cost avoidance of \$663 million. Mr. Magro currently leads a team responsible for all Navy project development and execution. In 2004, he worked with the Department of Energy to develop the current policy that provides credits toward energy reduction goals for cogenerating and installing cogeneration on sites. Due in part to this policy change, the Navy has since installed more than 50 megawatts of cogeneration, accounting for a four percent energy reduction per square foot. He is the Navy's subject matter expert on water savings, and authored a guide that assists installations with managing and conserving their water assets. Mr. Magro's leadership on an



A heat exchanger being installed at the Puget Sound Naval Shipyard. The heat exchanger increases the efficiency of the HVAC system by pre-heating the intake air.

efficiency project resulted in a shortened ESPC process from 18 months to 15 months.

Individual FY 2011

Antonino Piluso

NAS Sigonella, Italy

Antonino Piluso's leadership and long-term vision for renewable energy and sustainability helped NAS Sigonella reduce its energy and water intensity in FY 2011 by 3.5 percent and more than 8 percent respectively when compared with the prior year.

Following his promotion to energy manager in early 2011, he quickly developed a high quality, comprehen-

sive energy program. In his new position, Mr. Piluso supervised a wide range of efforts including a natural gas project that is helping to phase out the Air Station's existing diesel and fuel oil storage system that is used to heat both the facility's domestic and hydronic-systems water. Additionally, a 100-kilowatt PV carport completed in FY 2011 is the base's first large-scale PV project, and is to be followed by a second PV carport and solar thermal hot water projects intended to heat the Air Station swimming pools. Mr. Piluso further supervised a one megawatt PV ground mounted array that is in the final construction

planning stages, along with expanded irrigation services from reclaimed water from the base's wastewater treatment plant. Through Mr. Piluso's efforts, the base is planning more than three megawatts of renewable projects for implementation over the next seven years. He has also developed a robust building energy manager program, initiating the base's advanced metering implementation project.

NAS Sigonella also received the SECNAV Energy and Water Award for Navy Small Shore Installation, summarized earlier in this article.

Blue Awards for Well-Rounded Energy Programs

BLUE LEVEL ACHIEVEMENT recognizes a well-rounded energy program. The following commands will receive a certificate of achievement for the 2012 award cycle:

1. 1st Marine Corps District, Garden City, NY
2. Camp Allen, Norfolk, VA
3. Fleet Readiness Center East, Cherry Point, NC
4. Marine Barracks 8th & I, Washington, DC
5. Marine Corps Air Station Camp Pendleton, CA
6. Marine Corps Air Station Cherry Point, NC
7. Marine Corps Air Station Iwakuni, Japan
8. Marine Corps Base Camp Butler, Okinawa, Japan
9. Marine Corps Base Camp Lejeune, NC
10. Marine Corps Logistics Base Barstow, CA
11. Marine Corps Mountain Warfare Training Center, Bridgeport, CA
12. Naval Air Facility Misawa, Japan
13. Naval Air Station Corpus Christi, TX
14. Naval Air Station Fallon, NV
15. Naval Air Station Joint Reserve Base New Orleans, LA
16. Naval Air Station Key West, FL
17. Naval Air Station Meridian, MS
18. Naval Air Station Patuxent River, MD
19. Naval Air Station Whiting Field, Milton, FL
20. Naval Base San Diego, CA
21. Naval Submarine Base New London, Groton, CT
22. Naval Support Activity Annapolis, MD
23. Naval Support Activity Crane, IN
24. Naval Support Activity South Potomac, Washington, DC
25. Naval Support Activity Washington, DC
26. Naval Support Facility Diego Garcia
27. Naval Undersea Warfare Center Detachment Memphis, TN
28. Naval Undersea Warfare Center Division Newport, RI
29. Naval Weapons Station Yorktown, VA
30. Navy Information Operations Command Sugar Grove, WV
31. Navy Region Center Singapore
32. Norfolk Naval Shipyard, VA
33. Puget Sound Naval Shipyard & Intermediate Maintenance Facility, Bremerton, WA
34. USS Hopper (DDG 70)
35. USS McClusky (FFG 41)
36. USS Peleliu (LHA 5)

Program

Thomas Caffee

John Payne

Ray Smalling

Commander Mike Tasker

James Van Coney

U.S. Department of the Navy

NAVFAC Northwest

Naval Station Everett, Washington

Through a broad array of partnerships and practices that make them a sustainability leader among Navy installations, Naval Station Everett has reduced its energy intensity by about 28 percent, its water intensity by about 57 percent, and fleet petroleum consumption by more than 90 percent from their respective baselines. Naval Station Everett was the first Navy installation to fully benchmark their facilities in the U.S. Environmental Protection Agency's Energy Star Portfolio Manager. The base has an unprecedented ten Energy Star-certified buildings and two LEED Gold-certified buildings. The Naval Station was also one of the first Navy installations to acquire an advanced metering infrastructure. Eighty-eight percent of Naval Station Everett's vehicle fleet is alternative fuel capable, using 30,000 gallons of biofuels annually. In FY 2011, the site purchased 567-megawatt hours of wind energy, saved 4.4 billion Btu of energy, and conserved four million gallons of water through implemented efficiency projects.

U.S. Department of the Navy

Commander Fleet Activities Yokosuka (CFAY)

Yokosuka Naval Base, Japan

Yokosuka Naval Base, CFAY initiated an electrical demand reduction program in FY 2011, reducing energy purchased from the local Japanese grid by 25 percent during the peak summer period. The three months of summer energy savings equated to the use of 28 billion Btu less than in FY 2010, and translated into more than \$2 million in avoided costs. Program results far exceeded the 15 percent minimum reduction goal required by the Japanese government after the earthquake and tsunami in March. CFAY conducted a focused



Members of the Yokosuka Base Energy Team with system technicians.

Thomas Bawden

outreach and education campaign, providing a unified source of energy information that was continually delivered to base personnel through numerous communication channels to ensure maximum campaign exposure. The awareness initiative supplied 15 specific energy reduction steps that assisted members of the community in reducing their peak household and workspace electrical demands. Awareness, individual actions, and communication of new electric load requirements on the part of the entire CFAY community appear to have yielded more than 87 percent of the electric demand reduction. Overall, energy intensity was reduced in FY 2011 by more than 63 percent relative to the FY 2003 baseline.

Project

Greg Alsin

Phil Beste

Lee Anne Fowler

Nick Rau

Thomas Wellner

U.S. Department of the Navy

NUWC Division Keyport, Washington

NUWC Division Keyport successfully completed a \$16 million ESPC project in FY 2011 that reduced the command's total energy use by more than 30 percent from the prior year. In total, the ESPC contributes an annual energy savings of more than 77 billion Btu and provides an annual cost avoid-



Several buildings throughout NUWC Division Keyport received upgrades such as automated high-efficiency air conditioning systems and more efficient lighting that helped reduce energy usage by more than 35 percent the first year.

Pat Hardesty

Jeff Allen
Charles Howell
Sidney Mohseni
Jorge Perez
Bernadette Rose

**U.S. Marine Corps
Marine Corps Base Camp Pendleton,
California**

Early in FY 2011, Camp Pendleton completed construction of a 1.48-megawatt PV system that generates about 8.5 billion Btu annually and has already saved the base more than \$350,000 in energy costs during its first year of operation. The project was completed at the closed Box Canyon Landfill site without affecting the inactive landfill cap. It represents the largest PV system on a U.S. Marine Corps base and one of the largest in San Diego County. The system consists of 6,300 PV modules constructed on 225 array structures. The PV racks are supported by four precast concrete ballasts with a gravel base foundation and adjustable frame to support the modules. Eight additional PV systems also went on line during FY 2011, bringing the total capacity of new renewable energy on

ance of more than \$2 million. The primary intent of the ESPC was to reduce energy and water use by decentralizing Keyport's aging steam plant, which was prone to steam leaks, poor condensate return, and high maintenance needs. The ESPC supported repair of two significant underground water leaks, dramatically reducing water consumption by approximately 28 percent from the previous year. The project also installed energy efficient infrastructure for 37 buildings and implemented geothermal heat pumps and solar water heating systems that save 650 million Btu in annual renewable energy production. It is estimated that the projects reduce annual greenhouse gas emissions by the equivalent of more than 5,870 metric tons of carbon dioxide.

NUWC Division Keyport also received the SECNAV Energy and Water Award for Navy Other Shore Installation, summarized earlier in this article.

**U.S. Department of the Navy
NAS Jacksonville, Florida**

NAS Jacksonville completed the largest utility ESPC to date in the Naval Facilities Engineering Command Southeast Region, reducing its energy intensity by four percent and water consumption by 24 percent from the prior year during only four months of operation in FY 2011. This is equal to savings of 34 billion Btu of energy and 79 million

gallons of water, respectively. The \$17.3 million project audited more than 30 facilities and incorporated numerous upgrades including air handler unit ultraviolet lights, motor variable frequency drives, direct digital controls, fuel conversions, chiller retrofits and replacements, and boiler replacements. The venture also addressed heating, ventilation, and air conditioning mechanical opportunities such as chiller retrofits with magnetic bearing compressors. Exemplifying the contract's success, roof-mounted solar water heating systems were installed at several facilities, delivering an average of 3.8 million Btu per day. The first year of renewable cost savings exceeded \$30,000. Once fully implemented, the contract is expected to result in annual savings of more than 65 billion Btu and \$3.3 million, with estimated avoided greenhouse gas emissions of about 9,840 metric tons of carbon dioxide.



Photovoltaic system at Camp Pendleton's Box Canyon Landfill. It represents the largest PV system on a U.S. Marine Corps base and has already saved the base more than \$350,000 in energy costs during its first year of operation.



Representatives of the public/private team that realized the Navy's first landfill gas cogeneration plant at MCLB Albany, Georgia.

the base to 3.12 megawatts. Total annual generation from these systems is projected at 18.7 billion Btu, which will save about \$760,440 in annual electricity costs. Combined with other energy efficiency efforts, the systems helped Camp Pendleton reduce its energy use by more than six percent compared to FY 2010.

These PVs contributed to Camp Pendleton's significant strides in reducing its energy intensity measure, for which it also won the 2012 SECNAV Energy and Water Award in the "Marine Corps Large Shore Installation" category summarized earlier in the SECNAV Awards section of this article.

For additional information on the Box Canyon landfill PV system, see our article entitled "Landfill to Lighting: Closed Pendleton Landfill Becomes Home to Solar Arrays" in the summer 2012 issue of *Currents*.

U.S. Marine Corps MCLB Albany, Georgia

In FY 2011, MCLB Albany implemented a \$20 million ESPC that delivers process steam and 1.9 megawatt of renewable electric power to the base using landfill gas collected from a nearby landfill. This contract and other renewable energy projects implemented in FY 2011 will save the base more than 135 billion Btu and \$2.2 million annually, with an estimated reduction in greenhouse gas emissions equivalent to 19,300 metric tons of carbon dioxide. The cogeneration plant

consists of a dual-fuel engine generator and a stack heat recovery steam generator capable of delivering 3.3 million Btu per hour of steam from exhaust gas heat. Two dual-fuel boilers also provide a capacity of 10 million Btu per hour of steam production from renewable fuel. The plant can use landfill gas, natural gas, or a blend of the two fuels. As the base's actions exhibit, MCLB Albany is committed to becoming a net zero installation by focusing on energy efficiency and on-site renewable energy development. All renewable energy projects implemented at the base in FY 2011 produce an estimated 16.9 billion Btu, equivalent to more than 10 percent of the installation's total electricity consumption.

In addition to the FEMP award, MCLB Albany won a 2012 SECNAV Energy and Water award in the "Marine Corps Small Shore Installation" category summarized earlier in the SECNAV Awards section of this article.

For more details regarding MCLB Albany's landfill gas-to-energy project, see our article entitled "MCLB Albany Officials Flip Switch for Landfill Gas-to-Energy Plant: First-Ever Facility Will Produce Renewable Electric Power & Steam" in the winter 2012 issue of *Currents*. [📌](#)

CONTACTS

LT Richlyn Neal
Office of the Deputy Assistant Secretary of the Navy (Energy)
571-256-7878
DSN: 260-7878
richlyn.neal@navy.mil

U.S. Department of Energy
Office of Public Affairs
202-586-4940



Nominations Sought for CNO Environmental Awards Competition

This Year's Deadline is 10 January 2013

REAR ADMIRAL KEVIN Slates, Director, Chief of Naval Operations (CNO) Energy and Environmental Readiness Division (OPNAV N45), has called for nominations for the Fiscal Year (FY) 2012 CNO Environmental Awards competition.

Each year since 1962, the SECDEF has honored installations, teams and individuals for outstanding performance in promoting environmental stewardship.

Each year since 1962, the Secretary of Defense (SECDEF) has honored installations, teams and individuals for outstanding performance in promoting environmental stewardship. Since FY 2009, the awards have been staggered on a two-year cycle with large/small installations and industrial/non-industrial installations competing in alternate years. This year, Echelon II commands may submit nominations for each of the following award categories:

- Natural Resources Conservation (Large Installation)
- Cultural Resources Management (Installation)

- Cultural Resources Management (Individual or Team)
- Environmental Quality (Industrial Installation)
- Environmental Quality (Overseas Installation)
- Sustainability (Non-Industrial Installation)
- Sustainability (Individual or Team)
- Environmental Restoration (Installation)
- Environmental Excellence in Weapon System Acquisition, Small Program (Individual or Team)
- Environmental Planning (Team)
- Environmental Quality (Small Ship)

The achievement period for the FY 2012 CNO Environmental Awards is 1 October 2010 through 30 September 2012. Up to five nominations per category may be submitted for each of the individual/team and ship award categories. There is no restriction on the number of installation nominations that will be accepted for the installation award categories.

The guided-missile destroyer
USS Sterett (DDG 104).
Senior Chief MC Joe Kane



The guided-missile frigate
USS Thach (FFG 43).
MC1 Steve Smith



The guided-missile destroyer USS MOMSEN strives to set the example for environmental stewardship throughout the Navy.
MC Seaman Jerine Lee

All nominees will be judged qualitatively relative to six criteria. Following is a list of the criteria and a brief explanation of each. (Note: Criteria vary somewhat for the Weapons System Acquisition category.)

1. Program Management

Was there a management structure system in place? Did the nominee demonstrate improvement over the period under consideration?

2. Technical Merit

Did the nominee use innovative techniques? Were these techniques effective in preserving or enhancing the environment?

3. Orientation to Mission

Did the program contribute to the successful execution or enhancement of the nominee's military readiness/civil works mission? Was there substantive involvement of individuals directly responsible for the military readiness or civil works mission?

4. Transferability

Can others adopt this program elsewhere within and/or outside of the Department of Defense? Was some progress made in the transfer process?

5. Stakeholder Interaction

Did the program interact with the surrounding community, state and local regulators, and non-governmental organizations (U.S. only)? Was environ-

mental awareness and community involvement enhanced for base personnel and residents of military housing (overseas only)?


6. Project Impact

Will the technique and/or program endure over time? Is there a framework in place to build on/improve the nominee's accomplishments going forward?

Nominations are due to N45 no later than 11:59 p.m. Eastern Standard Time, 10 January 2013. Echelon II commands must submit nomination packages electronically via the CNO Environmental Awards website at <http://cnoenviroawards.com>. No paper copy or CD submissions will be accepted. Each Echelon II command will be provided a username and password for logging into the system to upload nomination packages.

Nominations are due to N45
no later than 11:59 p.m.
Eastern Standard Time,
10 January 2013.

CNO winners will advance to the Secretary of the Navy (SECNAV) Environmental Awards level of competition. SECNAV winners will advance to the SECDEF competition in all categories except the Environmental Quality—Small Ship award, which has no equivalent at the SECDEF competition level. The FY 2012 CNO Environmental Award winners will be honored at a ceremony in July 2013 at the U.S. Navy Memorial in Washington, DC.

For more information about the CNO Environmental Awards Program, visit <http://greenfleet.dodlive.mil/environment/awards/cno-environmental-awards>. 

CONTACT

Katherine Turner
Office of the Chief of Naval Operations
Energy and Environmental Readiness Division
703-695-5073
DSN: 225-5073
katherine.m.turner.ctr@navy.mil



New Website Highlights Navy Environmental Training Needs

New On-Line Resource is a One-Stop-Shop

THE NAVY'S ENVIRONMENTAL Readiness Training Program (NERTP) has developed a new website on the Defense Environmental Network & Information eXchange (DENIX) platform designed to serve as a comprehensive resource for Navy environmental training needs. It includes links to Navy training organizations, the latest environmental training catalog, and information on upcoming meetings.

The NERTP performs various functions including:

- Defines environmental and natural resources training requirements
- Identifies training priorities
- Recommends actions for resolving training issues
- Recommends changes to the Navy Training Systems Plan

The NERTP website features links to the training organizations, meeting information, and provides information on the Navy Environmental Readiness Training Program.

Why is training important to you? Environmental training is an important part of daily activities for Navy personnel and directly affects mission achievements. Current training offerings cover a variety of discipline areas including the



National Environmental Policy Act, hazardous materials management, and risk communications.

The site includes an easy-to-use template that streamlines the approach for requesting new training and provides the steering committee with relevant information necessary to design a new course.

For more information on the NERTP or to request a course, please visit https://denix.osd.mil/denix_secure/nertp (username and password required). [📌](#)

CONTACT

Julie Henkel
Chief of Naval Operations
Energy and Environmental Readiness Division
703-695-5092
DSN: 225-5092
juliana.henkel@navy.mil

Being Green in the Evergreen State

Energy & Water Conservation Are an “All Hands” Effort

THE PACIFIC NORTHWEST is traditionally known for its proactive stance towards sustainability. Energy and water conservation are a major part of the Navy’s efforts in supporting this goal. A brief sampling of the regional Navy achievements include:

1. Naval Station (NAVSTA) Everett’s achievement of 57.3 percent reduction in water consumption relative to the Fiscal Year 2007 baseline
2. Implementation of a water management policy to cease watering of non-essential areas during the summer months
3. Naval Undersea Warfare Center Division Keyport’s geothermal heat pumps and solar water heating system technologies enabling them to avoid purchasing 650 million British Thermal Units of fossil fuel energy annually
4. Puget Sound Naval Shipyard and Intermediate Maintenance Facility proactive pursuit of sustainable lighting options such as photo-sensors and Light Emitting Diodes
5. Naval Air Station (NAS) Whidbey Island’s recent completion of a Bio-Mass feasibility study.

These vehicles are among NAVSTA Everett’s fleet of 49 electric vehicles. Eleven more such vehicles are on order.



sustainability stance? How does the Navy stay ‘green’ in Washington—the Evergreen State? The answers are a coordinated and targeted regional and installation level strategies including:

1. Implementing early energy and water reviews of not just traditional energy and water projects but military construction and special projects
2. Utilizing all resource ‘tools’ in the Energy Manager’s ‘tool box,’ including Utility Energy Service Contracts
3. Focusing more on local low cost/no cost initiatives

4. Investigating new technologies and processes
5. Strengthening all partnerships with supported commands and activities.

Energy and water conservation sustainability are an “all hands” effort.

Regional sustainability efforts are reinforced by new guidance. To quote the recently released Naval Operations Instruction, OPNAVINST 4100.5E, “Navy policy is to ensure energy security and legal compliance, by increasing infrastructure energy efficiency and integrating cost-effective and mission-compatible alternative energy technologies while providing reliable energy supply ashore.” To quote Kermit the Frog, “It isn’t easy being green.” But with a strong culture of sustainability and a plan for a way forward, sustainability can be maintained and strengthened. ⚓

Energy and water conservation sustainability are an “all hands” effort.

In the transportation arena, NAVSTA Everett currently has 95 percent of all vehicles on base using alternative fuels and utilizes 49 slow moving vehicles and light trucks powered by electricity. NAS Whidbey Island is a Navy leader in recycling. Full implementation of organics recycling in all areas should increase its diversion rate to about 90 percent.

With resource reductions and operational requirement increases, what is the way forward to maintain this strong

CONTACT

Leslie Yuenger
Naval Facilities Engineering Command Northwest
360-396-6387
DSN: 744-6387
leslie.yuenger@navy.mil

Atlantic Test Ranges Green Team Committed to Energy Efficiency

Green Successes Mark One-Year Anniversary

WHILE OCTOBER IS National Energy Action Month, energy reform and energy conservation are more than ideas to think about only one month out of the year. The Naval Air Systems Command (NAVAIR) is committed to managing its energy consumption ashore and afloat by modifying energy intensive behaviors. Operating more efficiently will save money by reducing the amount we spend for power and fuel. These savings can be reinvested to strengthen combat capability and are good for the Sailor and Marine, taxpayer and environment.

NAVAIR is committed to managing its energy consumption ashore and afloat by modifying energy intensive behaviors.

Individuals at the Atlantic Test Ranges (ATR) at the Naval Air Station Patuxent River, Maryland are committed to doing their part to support NAVAIR's energy objectives. In August 2012, ATR celebrated the one-year anniversary of its "Green Team." The team's goals have been to encourage green initiatives at ATR. Comprised of Range Sustainability, Facilities, Information Technology and management personnel, as well as workforce volunteers dedicated to the environment, the group develops energy-saving initiatives that support NAVAIR and Naval Air Warfare Center Aircraft Division (NAWCAD) energy goals.

Rob Vargo, ATR Associate Director, is proud of the team and their efforts, and says, "The response to the Green Team has

been remarkable. Not only is the team motivated and excited to research initiatives that will save energy and money, the ATR workforce has also been a big help in suggesting projects."



Photocells were mounted to all new LED lights at ATR to operate the lights from dusk until dawn only.





75-watt halogen bulbs were replaced with 15-watt LED lights for 81 percent energy savings.

One of the team's first initiatives was to develop an electrical baseline for the ATR complex with support from the NAWCAD Energy and Environmental Effort Efficiencies office. Electrical usage is now being tracked on a monthly basis. The Green Team also focused on lighting upgrades—installing lighting timers in the ATR facility, testing occupancy sensors in another of ATR's buildings, and replacing outdated and inefficient 400-watt metal halide exterior lights with 26-watt Light Emitting Diode (LED) lights.

These changes were based on recommendations from the Southern Maryland Electric Cooperative (SMECO)—the local electric company, which worked with the Green Team to conduct lighting audits.

Recently, the Green Team submitted applications to SMECO to earn ATR a \$150 credit for each exterior LED lighting replacement, for a total savings credit of \$3,300. Coordination with SMECO also proved valuable when the electric cooperative installed no-cost programmable thermostats in two ATR buildings through the company's CoolSentry Program. This initiative not only helps reduce heating and cooling costs in these buildings, but helps avert regional energy shortages during periods of high demand and saves ATR money with an annual credit on electric bills.

The team is also working with ATR technical experts to find savings that come with newer technologies to provide

superior mission systems that support test and evaluation. Newer technologies are often much more energy efficient and the Green Team plans to document these savings and encourage additional efficiency measures where possible. The Green Team is also conducting research on other substantial projects for the future, like alternative heating and cooling technologies, solar power and water conservation techniques.

According to Vargo, everything is on the table. "If it makes ATR more efficient while curbing customer costs, we'll consider it for improvement."

If it makes ATR more efficient while curbing customer costs, we'll consider it for improvement.

—Rob Vargo

Outreach has also been an important part of the Green Team's mission. The team held a "Turn off the Juice" campaign during National Energy Awareness Month 2011, and cleaned up nearby beaches and organized a recycling drive for Earth Day 2012. To celebrate National Energy Action Month 2012, the ATR Green Team hosted events throughout October to share information on energy efficiency, culminating in a competition at the end of the month to test energy-efficient hand dryer models.

Reflecting on their first year, Melanie Anderson, Green Team lead, says, "As a new team, we didn't know what to expect. Our plan was to simply collect and research ideas that we could present to management. Fortunately, many of those ideas had already been percolating at ATR and leadership has been extremely supportive. We started with small projects we could quickly complete and established a process to review energy usage to help monitor future savings." ♡

CONTACT

Melanie Anderson
Atlantic Test Ranges
301-757-1723
DSN: 757-1723
melanie.anderson@navy.mil

Frangible Ammunition—Getting the Lead Out

A Good Solution for Human Health & the Environment

LEAD-BASED AMMUNITION is used throughout the Navy during Small Arms Qualification Training. This live-fire training is vital to the Navy's mission areas of Anti-Terrorist Force Protection, Visit Board Search and Seizure, and Unit Security. The majority of this type of training is executed on Commander, Navy Installations Command (CNIC) installations within Small Arms Training Centers.

The Department of Defense as a whole currently expends about three billion rounds of small and medium caliber ammunition based on lead compounds such as lead azide and lead styphnate. The use of lead-based ammunition results in environmental cleanup costs associated with air purification (e.g., ventilation cleaning, filter change, etc.), periodic removal of lead slugs from live-fire impact berms, structural damage to targeting systems, lights, baffles, and the necessary wipe-down of facility floors, walls and fixtures to remove lead-based particulate. In addition, because of these concerns, lead-based ammunition is also becoming less available.

Recently, an alternative has been made available called "frangible" ammunition. This ammunition is lead-free and can deliver the same capability with respect to training as its lead-based counterpart. Increased use of this type of round will result in a healthier training environment, reduced costs with respect to environmental cleanup, and less damage to facility infrastructure.

A closer examination is necessary to understand the negative aspect of lead-based ammunition. There are several key areas that need to be factored into an analysis of any comparison between lead-based rounds and frangible rounds. These include:

- **Environmental lead removal costs**
These vary based upon the size of the impact area and the type of small arms range.
- **Human health hazard**
The use of lead-based ammunition for training poses a health risk to the trainee. Handling of lead-based ammunition and contaminated weapons can produce elevated lead levels in the blood by absorption or

ingestion. Lead-based materials are increasingly being linked to several serious health conditions.

- **Damage to facilities**
Over time, use of lead-based ammunition causes a considerable amount of damage to the facility's infrastructure and equipment. Vent ducting penetration, baffle destruction, target deployment/retrieval system damage are all related to the penetrating type of round that is typically used for training. CNIC estimates corrective maintenance issues to be in the range of \$1 million per year.
- **Mission readiness degradation due to facility closure**
Environmental remediation, corrective maintenance or high lead levels can result in a facility being closed and unavailable for training for weeks or months. In numerous cases, the range may be the only suitable facility in the area.

The use of frangible ammunition will mitigate and possibly eliminate these negative consequences to a significant extent. The Navy's Center for Security Forces (CENSECFOR) is operating several ranges where the only authorized ammunition is frangible. "It is our belief that using anything other than frangible ammunition would significantly reduce the lifespan and usability of our modular ranges in Mayport, Florida and Chesapeake, Virginia," says Dan Jasper, Logistics and Training Readiness Manager for CENSECFOR.

Randy Jackson, Navy Facilities Engineering Command Small Arms Range (SAR) Director, who is responsible for certification of the CNIC's SAR ranges, supports the use of frangible rounds for training.

"The Navy's frangible rounds are lead-free and a big advantage is that the waste stream is typically collected in exhaust filters and high-efficiency particulate arresting vacuum bags and can be disposed of as regular waste. However, the rounds themselves are not completely nontoxic as they typically include mixtures of other metals or metal alloys. They still present a potential health hazard if a proper ventilation system is not provided," said Jackson. (Note: Some alloys include nickel, which produces some respiratory toxicity.)

The use of frangible rounds will ensure that a facility incurs less damage and maintenance costs than lead-based rounds. Frangible rounds are much safer than ball rounds because they do not ricochet—they disintegrate and essen-

tially turn to dust when impacting a harder surface. Shown below is a list of Navy approved frangible ammunition.


U.S. NAVY APPROVED LEAD-FREE FRANGIBLE AMMUNITION

Identification Code	Caliber	Frangible or Not
AA16	9mm	Frangible
AA17	5.56mm	Frangible*
AA40	5.56mm	Frangible
AA86	00 Buck	Frangible

*Frangible and Reduced Ricochet, Limited Penetration

The current drawback to using frangible ammunition is cost and availability. The frangible round is more expensive than a regular lead round; however, cost is expected to decrease with increased demand. The armed forces use between 300 million and 400 million rounds of small-caliber ammunition each year. Frangible rounds are currently not produced in the quantity necessary to support the Navy's training requirements. There is no

timetable for fully incorporating frangible ammunition into the Navy training regimen.

Facility damage through usage and health hazards is expected wherever there is live-fire training being conducted. While these negative consequences will never be completely eliminated, it is clear the use of frangible ammunition is one step toward mitigating the inherent risks associated with small arms qualification training. 

CONTACTS

Mark Gruber
Commander, Naval Installations Command
619-532-3251
DSN: 522-3251
mark.gruber@navy.mil

Leonard Garcia
Commander, Naval Installations Command
619-532-3551
DSN: 522-3551
leonard.s.garcia@navy.mil

Be Part of the Navy's Best Magazine • Submit Your Article by 19 April

Have some good news about your environmental or energy program? Want to share it with others? *Currents* is the place to do it. *Currents*, the Navy's official energy and environmental magazine, has won first place in the Navy's Chief of Information Merit awards competition—not once, not twice, but three times! And it's people like you that make *Currents* the best magazine in the Navy.

Your experiences take on new meaning when you share them with the *Currents* readership and on Facebook.

So if you have a success story that you'd like us to promote in our summer 2013 issue, you'll need to submit your text and images by Friday, 19 April 2013. Any submissions received after this date will be considered for our fall 2013 issue.

You can get a copy of the *Currents* article template by sending an email to Bruce McCaffrey, our Managing Editor, at brucemccaffrey@sbcglobal.net. This template has proven to be a tremendous asset in helping us edit and track your article submissions. And your chances of being published in *Currents* are dramatically increased if you use this template and submit all of your images as separate documents. Bruce is available at

773-376-6200 if you have any questions or would like to discuss your story ideas.

As a reminder, your Public Affairs Officer must approve your article before we can consider it for inclusion in the magazine.

Don't forget to "like" us on Facebook at www.facebook.com/navycurrents. *Currents'* Facebook page helps expand the reach of the magazine and spread the news about all the great work you're doing as the Navy's energy and environmental stewards. And your experiences take on new meaning when you share them with the *Currents* readership and on Facebook.

Currents Deadlines

Summer 2013 Issue: Friday, 19 April 2013
Fall 2013 Issue: Friday, 19 July 2013
Winter 2014 Issue: Friday, 18 October 2013
Spring 2014 Issue: Friday, 17 January 2014

You can also refer to your *Currents* calendar for reminders about these deadlines.



From the 1 Gigawatt Task Force: A Strategy for Renewable Energy

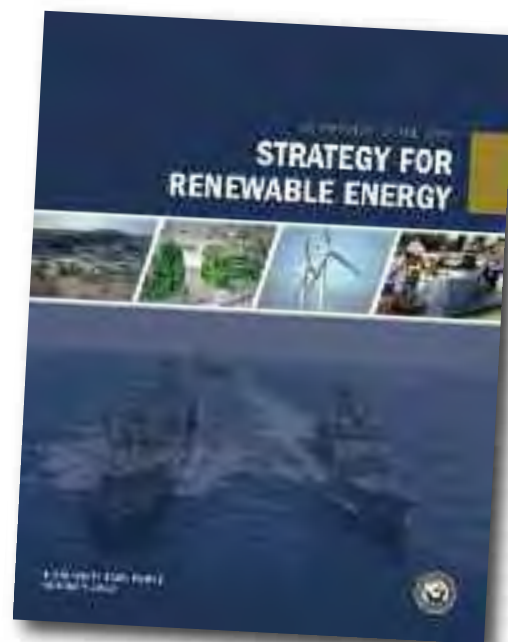
Meeting Secretary Mabus' Energy Goals for Installations

THE DEPARTMENT OF the Navy (DON) has completed and published its Strategy for Renewable Energy by which Navy and Marine Corps installations will procure or produce 1GW of renewable energy by 2020 to meet Secretary Mabus' energy goals.

President Obama, in his State of the Union address to Congress in January 2012, said that the "Navy would purchase enough renewable energy capacity to power a quarter of a million homes," or enough renewable energy to power a city the size of Orlando, Florida. This commitment from the President

sources. These are indeed lofty goals—difficult but achievable.

To address these goals and the President's commitment, Secretary Mabus chartered the 1 Gigawatt Task Force to develop a strategy by the end of Fiscal Year (FY) 2012 for DON to purchase or facilitate the production of approximately 1GW of renewable energy (RE) for use on Navy and Marine Corps installations. Chaired by the Assistant Secretary of the Navy (Energy, Installations and Environment (ASN EI&E)), its principal membership includes Secretariat, Navy, and Marine Corps leadership.



No one ever did anything big by being timid.

—Secretary Ray Mabus

supports the five energy goals set forth by Secretary of the Navy Ray Mabus in October 2009. Among these goals is that, by 2020, 50 percent of DON energy consumption will come from alternative sources, and that DON will produce at least 50 percent of shore-based energy requirements from alternative

In October 2012, the 1 Gigawatt Task Force published DON's Strategy for Renewable Energy. The document describes what we need to do, details the RE "landscape" in which we're working, explains the reasons why it's important, and lays out critical tasks by which our Navy and Marine Corps leadership will begin to

implement this essential journey toward energy security and energy independence. It is a beginning—but it is also truly a living document which will change, grow, and evolve as time progresses and circumstances evolve; much effort will be required in the months and years ahead. As Secretary Mabus high-

Landfill gas is the fuel source for the 1.9MW generator at MCLB Albany, Georgia. The system also uses waste heat to produce steam for buildings on the base.

lighted at the Navy Energy Forum 17 October 2012, “no one ever did anything big by being timid.” The Department is squarely behind the Secretary to reach all five goals on time.



A Dual Focus

To achieve Secretary Mabus’ goal of producing 50 percent of the Navy’s shore energy requirements from renewable sources, the Navy must both reduce its demand for energy while simultaneously greatly increasing the generation of RE on or near its installations.

Since 1980, and with a particular push within the past few years, DON has focused heavily on maximizing energy efficiency. DON has implemented \$1.6B of life-cycle efficiency improvements and reduced energy intensity (energy per square foot) by 18.5 percent since 2003. Furthermore, DON is a leader in Federal use of energy

contracts (energy conservation investment program (ECIP), energy service performance contracts (ESPC) and utility energy service contracts (UESC)), having implemented 165 ECIPs, 70 ESPCs, and 275 UESCs since 1998. This effort has been and remains absolutely necessary for several reasons. First, the cheapest kilowatt is the one that is never burned, and energy savings are the most direct, effective method to protect scarce resources. Second, many of DON’s buildings and facilities use electricity at unacceptably high intensities, and are therefore logical and important targets for improvement. Lastly, as part of the Navy’s ongoing efforts to be good neighbors to our host cities and regions, the Navy must be able to respond quickly and intelligently to emergencies and support utility-wide efforts to control incidents affecting the commercial grid.

With the Navy’s efficiency programs on track and maturing, it must now direct its focus to electrical genera-

Secretary Mabus’ Energy Goals

THE UNITED STATES Navy and Marine Corps rely far too much on petroleum, a dependency that degrades the strategic position of our country and the tactical performance of our forces. The global supply of oil is finite, it is becoming increasingly difficult to find and exploit, and over time cost continues to rise.

So in order to improve our energy security, increase our energy independence, and help lead the nation towards a clean energy economy, the Department of the Navy established the following five ambitious energy goals that will move the Navy and Marine Corps away from a reliance on petroleum and will dramatically increase our use of alternative energy.

1. **Energy Efficient Acquisition.** Evaluation of energy factors will be mandatory when awarding contracts for systems and buildings.
2. **Sail the “Great Green Fleet.”** DON will demonstrate a Green Strike Group in local operations by 2012 and sail it by 2016.
3. **Reduce Non-Tactical Petroleum Use.** By 2015, DON will reduce petroleum use in the commercial fleet by 50 percent.
4. **Increase Alternative Energy Ashore.** By 2020, DON will produce at least 50 percent of shore-based energy requirements from alternative sources; 50 percent of DON installations will be net-zero
5. **Increase Alternative Energy Use DON-Wide.** By 2020, 50 percent of total DON energy consumption will come from alternative sources



A 13.8MW solar PV array under construction at NAWS China Lake, California. Acting Assistant Secretary of the Navy (Energy, Installations and Environment) Roger Natsuhara cut the ribbon for this project on 19 October 2012.

tion on or near DON installations. This is a key component of what will ultimately become a truly secure energy posture for the Department. The ability to sustain critical missions

in the face of prolonged commercial grid outages is not possible without on-site, independent generation capacity. Renewable energy projects can greatly assist in filling that need.

The Renewable Energy Landscape and the 1GW Strategy

Today, DON produces just over 20 percent of the electricity it consumes from renewable sources. Our single largest production facility is the Coso Geothermal Plant located on Naval Air Weapons Station (NAWS) China Lake, California. Coso generated 270MW at its peak production level, but now produces about 170MW because the heat source has diminished; it continues to shrink by about one to two percent per year. The Navy has three waste-to-energy plants which produce a combined 45MW of base-load electricity, and the balance of DON's renewable energy production comes from solar photovoltaic (PV) systems at dozens of installations ranging in size from a few kilowatts to 4.6MW, and two wind systems (U.S. Naval Station Guantánamo Bay and Marine Corps Logistics Base (MCLB) Barstow, with capacities of 3.8MW and 1MW respectively).

What Does "One Gigawatt" Mean?

ELECTRICAL POWER IS sometimes discussed in terms of consumption (expressed in kilowatt-hours (kWh) and megawatt-hours (MWh)) and generation (expressed in kilowatts (kW) and megawatts (MW)). Adding to the complexity, generation has several categories including base-load, peak, and stand-by or reserve. Some renewable electricity generation falls into the peak category because of its intermittent nature; it does not produce base-load, grid-stabilizing power and frequently requires stand-by generation capacity to back it up in the event of cloud cover or insufficient wind. Others such as hydro, biomass or geothermal fall into the baseload category. A renewable energy capacity factor indicates the actual energy output over a period of time versus its nameplate generation capacity. Overall, wind and solar power produce electricity at about 25 to 30 percent of "nameplate" capacity.

According to the Energy Information Agency, the average American household consumed 11,496 kWh in 2010, the latest year for which data are available. Multiplied by "a quarter-million" as the President mentioned, the amount of 24-7 generation capacity needed to meet that demand is just over 328 MW. Because DON expects most of its new renewable energy production to come from intermittent sources, 328 MW factors up to approximately one gigawatt of intermittent generation at a 30 percent capacity factor. This estimate is approximately the capacity of RE needed to meet the Secretary's 50 percent goal. As the strategy moves into implementation, higher-factor projects (e.g., geothermal, biomass, or waste-to-energy) contribute toward the 1GW goal at a rate approximately three times that of intermittent sources. Such projects also significantly enhance an installation's true energy security since the power is more often available.

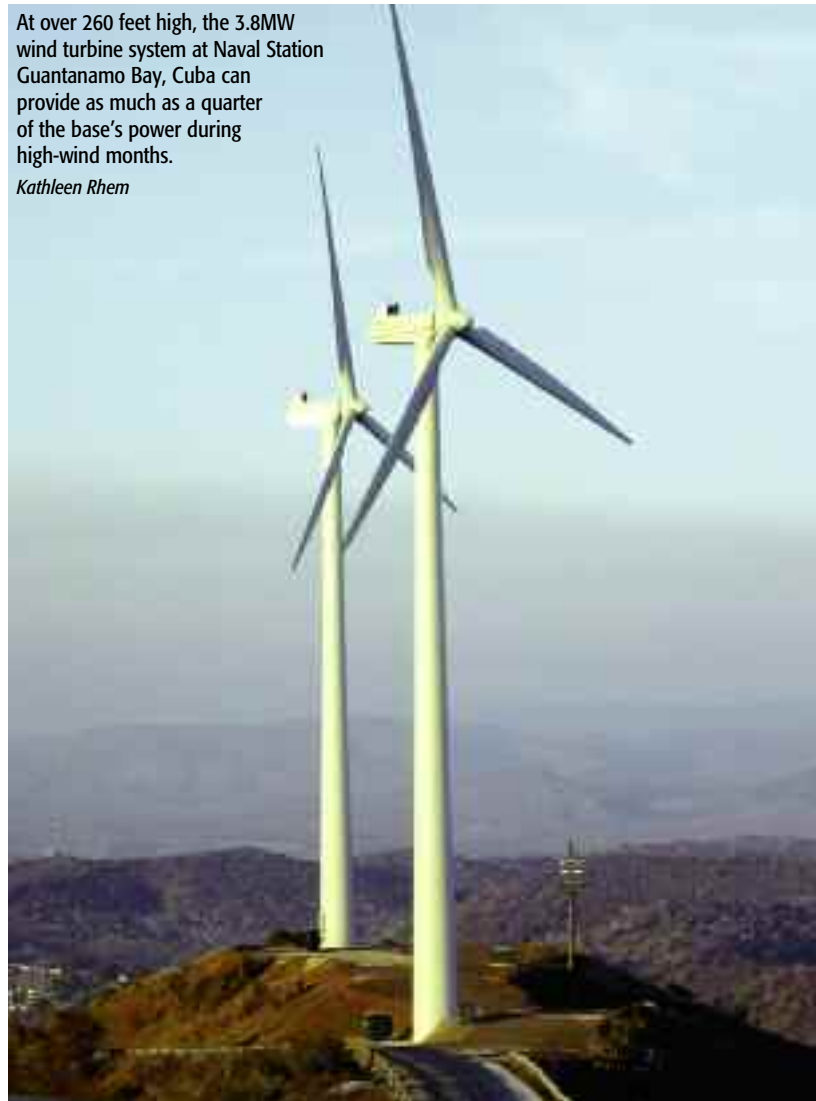
Since the introduction of Secretary Mabus' five energy goals, only a few small renewable energy projects have been successfully executed, and most of those were local initiatives at the installation level. However, nine significant (greater than 1MW) projects are under contract or under construction across DON today. These include a wind project at the Atlantic Undersea Test and Evaluation Center range in the Bahamas (1MW). The other eight projects use solar PV; the largest of which is a 13.8MW PV system at NAWS China Lake which came on-line in late October 2012.

The 1GW Strategy tasks Navy and Marine Corps leadership to continue this positive trend in facilitating the production of renewable energy generation at Navy and Marine Corps installations. As part of their energy plans, installations and regions will carefully assess which technology or combination of technologies will be most suitable and cost effective in their areas, and then identify the best opportunities for RE projects. While the core of the 1GW strategy focuses on developing large projects (greater than 20 MW capacity) in the Navy's RE resource-rich areas to achieve significant progress toward the 1GW total, they alone will not be enough. Also critically important is the identification and development of a variety of smaller projects on bases everywhere that will incrementally bring DON closer to its absolute goal. Where possible, these smaller projects might be aggregated regionally to streamline the whole process and attract better third-party financing.

The best overall contractual arrangements are typically through a 10 USC §2292a power purchase agreement (PPA),

At over 260 feet high, the 3.8MW wind turbine system at Naval Station Guantanamo Bay, Cuba can provide as much as a quarter of the base's power during high-wind months.

Kathleen Rhem



The ability to sustain critical missions in the face of prolonged commercial grid outages is not possible without on-site, independent generation capacity.

but joint ventures for the sale of electricity through 10 USC §2916 or enhanced-use leases through real estate arrangements might work well in some situations. (Note: 10 USC 2922a enables the military Services to enter into long-term contracts (up to 30 years) for the development of energy production facilities on Department of Defense or private lands and the purchase of energy generated from such facilities.)

These third-party arrangements enable DON to realize its RE goals with little to no cost to the taxpayer, as developers incur the upfront costs inherent to any project. The Department cannot fully realize its energy security and independence potential without the expertise and ingenuity of its neighbors and fellow citizens, therefore partnerships with industry and local communities will be essential to our success.



The 170MW geothermal power plant at NAWS China Lake is the largest generator of clean, renewable energy in the DON.

The Department cannot fully realize its energy security and independence potential without the expertise and ingenuity of its neighbors and fellow citizens.

Looking Toward the Future


Future projects in the conceptual stage include PV systems potentially on the order of 100 + MW at Marine Corps Air Station (MCAS) Yuma (the Barry Goldwater Range) in Arizona and Naval Air Station (NAS) Lemoore in California. These bold ideas face some hurdles—regional grid capacity to carry the excess electricity generated, and relatively low rates in central California for example—but we’re pressing ahead with environmental assessments and detailed business analyses to develop a full, detailed understanding of all the market factors and developers’ potential interest.

Other projects in the conceptual stages include other, smaller PV arrays at various locations in Hawaii, additional waste-to-energy projects in conjunction with existing ones at MCLB

Albany, Georgia, and MCAS Miramar, California. Overseas bases are also looking for opportunities, particularly in host countries whose governments have supportive renewable energy policies such as Spain and Japan.

The essential requirement as described in the Strategy for Renewable Energy is that every region, installation, and engineering office throughout the Department must collaborate with their host communities, industries, utilities, and other Department of Defense installations where possible, to explore and eventually develop RE capability and capacity wherever it makes sense to do so, economically and in terms of energy security and independence. Renewable energy is a critical piece of the energy security architecture and in most cases will take the longest amount of time to develop. The other

pieces—energy efficiency, energy storage (as it becomes economical at the multiple-megawatt scale), and smart microgrids—all have their roles to play. But without an on-site generation capability our installations will still be reliant on external sources of energy.

For a copy of the Strategy for Renewable Energy, contact the Office of the Deputy Assistant Secretary of the Navy (Energy) at the information provided below. For more information on the Department of the Navy’s energy program visit <http://greenfleet.dodlive.mil>. 

CONTACT

CAPT Kerry Gilpin
Office of the Deputy Assistant Secretary
of the Navy (Energy)
571-256-7873
DSN: 260-7873
kerry.gilpin@navy.mil

NESDI FY13 Needs Solicitation Yields Twenty Priority Needs

Annual Process Once Again Successful at Tapping into Unresolved Environmental Needs

THE NAVY ENVIRONMENTAL Sustainability Development to Integration (NESDI) program's Fiscal Year (FY) 2013 needs collection process yielded 58 submittals from across the Navy. After a thorough review by program personnel, a solicitation for proposals has been executed to address 20 needs determined to be priorities by personnel from the program's management team—the Technology Development Working Group (TDWG)—and resource sponsor—the Chief of Naval Operations Energy and Environmental Readiness Division (N45). Successful proposals will result in new projects beginning in FY13 and beyond.

Each year the NESDI program executes a formal process for collecting outstanding environmental needs from the

- the Naval Facilities Engineering Command (NAVFAC)
- the Space and Naval Warfare Systems Command (SPAWAR)
- Commander, Naval Installations Command (CNIC)

Once needs were compiled, the TDWG met to consider all of the needs—determining whether a need was valid (within the scope of the NESDI program, not already being addressed by the program, etc.). The TDWG then ranked those needs based on the program's investment priorities. A need can be considered by the NESDI program if it falls within one of the following Navy Environmental Enabling Capabilities (EEC):

Each year the NESDI program executes a formal process for collecting outstanding environmental needs from the Fleet.

Fleet. Fleet personnel or their representatives actively participated to identify and document various operational challenges. After a thorough review by the TDWG, 20 needs were selected as the basis for new projects. The TDWG is comprised of technical experts from the following Navy System Commands:

- the Naval Air Systems Command (NAVAIR)
- the Naval Sea Systems Command (NAVSEA)

1. Range Sustainment (EEC-2)

Investments in innovations that address environmental impacts and restrictions at Navy ranges to ensure that Naval training ranges and munitions testing/manufacturing ranges are fully available and efficiently utilized.

2. Ship-to-shore Interface (EEC-4)

Investments in innovative techniques to manage ship hazardous material/waste offload to shore facilities.



3. Weapon System Sustainment (EEC-3)

Investments in Fleet maintenance operations with the overall objectives of reducing the cost of compliance and increasing mission readiness.

4. Air and Port Operations (EEC-4)

Investments that address issues pertaining to air and port operations that ensures Fleet readiness.

Fleet Operational Needs

THE FOLLOWING 20 priority Fleet operational needs (with environmental solutions) resulted from the program's validation, consolidation and ranking process for FY13.

NO.	NEED	COMMAND	TITLE
1.	N-0847-13	NAVFAC	Reduce Wastewater Treatment Plant Salinity
2.	N-0861-13	NAVFAC	Compliance Options Study For National Pollutant Discharge Elimination System (NPDES) for Cooling Water Intake Structures at Existing Facilities
3.	N-0862-13	NAVSEA	NPDES Clean Sampling Techniques
4.	N-0867-13	NAVFAC	Infrastructures Reducing Storm Water Fees
5.	N-0869-13	NAVFAC	Demonstration of Sustainable Remedy For Treating Low pH Aquifer Contaminated with Continuing Source of Chlorinated Ethenes Tetrachloroethene and Trichloroethene from Closed Landfill
6.	N-0870-13	NAVSEA	Biological Fouling Reduction To Ships Cooling Water Systems
7.	N-0871-13	NAVAIR	Low-Volatile Organic Compound and Low-Hazardous Air Pollutant Wipe Solvent and Paint Thinner Demonstration/Validation
8.	N-0874-13	NAVFAC	Alternative Treatment Technology to Pump and Treat for Munitions Constituent-Contaminated Groundwater
9.	N-0876-13	NAVFAC	Improved Methods and Tools for Remedy Selection at Contaminated Sediment Sites
10.	N-0878-13	NAVAIR	Replace Lead Moldings for Sheet Metal Forming with New Technology
11.	N-0880-13	NAVAIR	Filtering Aqueous Plating and Cleaning Shop Chemicals to Extend Bath Life
12.	N-0883-13	NAVAIR	Ultra High Pressure Water Jet System Equipment Procurement and Related Installation
13.	N-0887-13	NAVSEA	Drydock Sediment Management
14.	N-0895-13	NAVAIR	Elimination of Hexavalent Chromium from Aircraft Structural Adhesive Bonding
15.	N-0898-13	NAVSEA	Develop Process and Equipment for Wholesale Removal of Rubber Coating on Submarines
16.	N-0899-13	NAVAIR	De-Painting of Naval Aircraft—Alternative to Chemical/Media Removal Technology
17.	N-0900-13	NAVSEA	Develop Process and Equipment to Capture Smoke Plume from Oxy-Fuel Cutting Torch During Ship Demolition
18.	N-0902-13	NAVAIR	Revised Chromium National Emission Standards for Hazardous Air Pollutants Housekeeping Compliance
19.	N-0906-13	NAVFAC	Autonomous Underwater Vehicle Monitoring of Marine Environment Contaminants in Harbors and Waterways Impacted by Naval Operations
20.	N-0907-13	NAVFAC	Effective Operation and Maintenance of Storm Water Best Management Practices/Low Impact Development

TDWG Membership

MEMBERS OF THE NESDI program's TDWG can be contacted at the following phone numbers and email addresses:

NAME	COMMAND	PHONE	EMAIL
Karr, Leslie (Chair)	NAVFAC	805-982-1618	leslie.karr@navy.mil
Cahoon, Lynn	NAVAIR	252-464-8141	albert.cahoon@navy.mil
Earley, Pat	SPAWAR	619-553-2768	patrick.earley@navy.mil
Hall, Chaela	CNIC	202-433-4962	chaela.hall@navy.mil
Heath, Jeff	NAVFAC	805-982-1600	jeff.heath@navy.mil
Hertel, Bill	NAVSEA	301-227-5259	william.hertel@navy.mil
McCaffrey, Bruce	Consultant	773-376-6200	brucemccaffrey@sbcglobal.net
McVey, Tami	CNIC	202-433-4959	tami.mcvey2@navy.mil
Olen, Jerry	SPAWAR	619-553-1443	jerry.olen@navy.mil
Paraskevas, Nick	NAVAIR	301-757-2140	nicholas.paraskevas@navy.mil
Rasmussen, Eric	NAVAIR	732-323-7481	eric.rasmussen@navy.mil
Sugiyama, Barbara	NAVFAC	805-982-1668	barbara.sugiyama@navy.mil
Webber, Cindy	NAVAIR	760-939-2060	cynthia.webber@navy.mil

Needs that pose significant operational risk to the Fleet
and fit the program's investment priorities
were the most highly ranked.

5. Regulatory and Base Operations (EEC-5)

Investments in cost effective methods for identifying, analyzing and managing environmental constraints related to current and projected regulatory impacts.


Once the TDWG had completed its rankings, those preliminary rankings were passed along to the appropriate subject matter experts at N45. Once N45 had reviewed and approved the TDWG's preliminary rankings, Leslie Karr, the NESDI program manager, then published a request for pre-proposals to address the Navy shoreside priority environmental needs.

Priority Fleet Needs

Needs that pose significant operational risk to the Fleet and fit the program's investment priorities were the most highly ranked. Need submitters with needs that were not highly ranked by the NESDI program in FY13

were contacted and given comments to strengthen future submissions.

The deadline for pre-proposals that address the program's priority needs was 14 November 2012. These pre-proposals will be evaluated and ranked by a representative of each of the program's Functional Working Groups and the TDWG. The call for full proposals was issued on 13 December 2012.

For more information about the FY13 priority needs as well as other information about the NESDI program, visit the program's web site at www.nesdi.navy.mil. 

CONTACT

Leslie Karr
Naval Facilities Engineering and Expeditionary Warfare Center
805-982-1618
DSN: 551-1618
leslie.karr@navy.mil

LMR Program Holds First In-Progress Review

Researchers Highlight Successes, Management Team Convenes to Steer Future Investments

THE NAVY'S LIVING Marine Resources (LMR) program convened its first In-Progress Review (IPR) to hear about what researchers from across the globe are doing to help the Navy develop, demonstrate, and assess new solutions to protect living marine resources while preserving core Navy readiness capabilities.

Sponsored by the Chief of Naval Operations Energy and Environmental Readiness Division (CNO N45), the LMR program achieves the above mission by:

1. Providing science-based information to support Navy environmental effects assessments for at-sea training and testing.
2. Improving knowledge of the ecology and population dynamics of marine species of concern.
3. Developing the scientific basis for the criteria and thresholds to measure the biological effects of Navy generated sound.
4. Improving understanding of underwater sound and sound field characterization unique to assessing the biological consequences of underwater sound (as

opposed to tactical applications of underwater sound or propagation loss modeling for military communications or tactical applications).

5. Developing technologies and methods to mitigate and monitor environmental consequences to living marine resources resulting from naval activities on at-sea training and testing ranges.

In an effort to gain insights into the program's current research portfolio, the LMR program manager convened an IPR of researchers and its management team—the Living Marine Resources Advisory Committee (LMRAC)—at the Naval Facilities Engineering and Expeditionary Warfare Center (formerly the Naval Facilities Engineering Service Center) in Port Hueneme, California on 16-18 October 2012.

Representatives from the program's resource sponsor organization (CNO N45) as well as members of the management team from the LMR's sister research program—the Navy Environmental Sustainability Development to Integration program—joined LMR personnel to evaluate current LMR projects and plan future investments to keep the program properly focused.

LMR researchers, staff and LMRAC members were welcomed to Naval Base Ventura County by CAPT Brant D. Pickrell, commanding officer of the Naval Facilities Engineering and Expeditionary Warfare Center. The meeting was opened with a keynote address by Deputy Assistant Secretary of the Navy (Environment),



Bottlenose dolphins.

Mr. Don Schregardus. A sense of the current program scope and level of effort is provided by the following summaries of major LMR projects:

Marine Mammal Monitoring on Ranges (M3R)

Mr. Dave Moretti, Naval Undersea Warfare Center (NUWC), Newport, RI

The Marine Mammal Monitoring on Ranges (M3R) program is currently being developed and evaluated at three Navy training and exercise ranges equipped with arrays of acoustic sensors that can detect marine mammals:

1. The Atlantic Undersea Test and Evaluation Center (AUTC) in The Bahamas
2. The Southern California Offshore Range (SCORE) at San Clemente Island, California
3. The Pacific Missile Range Facility (PMRF) in Barking Sands, Hawaii

The objective of this project is to gain a better understanding of the interaction between marine mammals and sound, and to provide real time marine mammal monitoring capabilities in support of range operations.

National Oceanic and Atmospheric Administration (NOAA) Southwest Fisheries Science Center (Dr. John Durban) and the Bahamas Marine Mammal Research Observatory (Ms. Diane Claridge and her colleagues) verify species identity of animals detected acoustically by M3R and correlate the data from tags placed on the animals with the acoustic data from M3R.

The Southern California Offshore Range

SCORE has many more sensors (about 200 sensors) than AUTC, but the same basic system architecture, enabling exportation of the M3R technology developed at AUTC to similar ranges like SCORE and PMRF. With the original data and knowledge from the AUTC range, researchers have been able to acoustically identify beaked whales and many other marine mammal species on the range. The biggest difference between SCORE and other ranges is the number of animals; the Southern California Bight region is one of the richest marine mammal habitats in the world, both in terms of species variety and absolute numbers of animals per unit area.

This site therefore challenges the M3R acoustic classifier program in ways that the less populous AUTC site does not. Not only are animals so abundant that the sheer

The objective of this project is to gain a better understanding of the interaction between marine mammals and sound, and to provide real time marine mammal monitoring capabilities in support of range operations.

At each of these three sites, the M3R team collaborates with local expert marine mammal research teams, which perform visual surveys, photo-identification of marine mammal populations, and animal tagging and tracking to verify and calibrate M3R results and build a multi-sensor picture of animal abundance on the Navy ranges, their habitat use, and responses to Navy activities on the range.

The Atlantic Undersea Test and Evaluation Center

The AUTC range is home to a sizable population of beaked whales. These whales have lived on the Navy range for an extended time in the presence of active sonar use. The M3R program is assessing animal responses when sonar is active, as well as monitoring baseline usage of the range by beaked whales (and other species) when the range is not in use. Research partners from the

number of calls is uncountable, but many types of sounds, like dolphin whistles, remain very difficult to sort by species. Using the same model of collaboration developed at AUTC, the M3R team partners with local research experts Ms. Erin Falcone and Mr. Gregg Schorr of the Cascadia Research Collective to visually confirm M3R species identifications, compare abundance estimates from M3R acoustics to visual and photo-identification methods, and confirm animal responses to sound via tagged animals tracked during naval activities on the range.

Pacific Missile Range Facility

PMRF presents its own unique monitoring conditions. The instrumented range is even larger than the SCORE range and covers an area of 1500 square kilometers, from shallow to deep water (200 to 4,000 meters). PMRF



Sperm whale.

marine mammal densities appear to be somewhere between those for SCORE and AUTECH.

During 2011 initial species verification testing was performed, using the same partnership process successfully employed at AUTECH and SCORE. Dr. Robin Baird of the Cascadia Research Collective provides species verification, using visual and acoustic data, photo-identification and tagging. In obtaining baseline data, researchers are looking for seasonal- and/or activity-related movements, just as they do at AUTECH and SCORE.

The goals of M3R are threefold. One goal is to develop automated marine mammal detection, localization, classification and display tools that will enable range staff to perform their own mitigation monitoring without the assistance of expert scientific staff. That transition is the most immediate goal. A second goal is to establish baseline population density, abundance and habitat usage data for Navy risk analyses and permit applications covering fleet activities on the ranges. That capability will also transition soon to operational support for long-term population status and trends monitoring, following completion of calibration evaluations. With multiple calibrated methods (visual, passive acoustic, tagged animal and photo-identification) the Navy will be able to use the mix of methods that provides the best data for the least expense. The third goal is to translate M3R observations of animal responses to Navy activities, including mid-frequency anti-submarine warfare (ASW)

sonars, into behavioral response metrics useful in revising regulatory risk criteria for permitting purposes. This work involves integration of M3R data with independently developed data by playback studies (discussed in the SOCAL Behavioral Response Study (BRS) summary below), statistics experts, and modelers. The Office of Naval Research (ONR) plays a vital partnership role in converting M3R observations into integrated models of animal response to sound, and the biological significance of those responses. The goal is to have M3R data provide a significant contribution to improved behavioral risk criteria for the next (Phase III) round of environmental documentation and permitting in the 2014–2017 time frame.

SOCAL Behavioral Response Study

Dr. Brandon Southall, SEA Inc.

Dr. John Calambokidis, Cascadia Research Collective

Dr. Peter Tyack, Woods Hole Oceanographic Institution and University of St. Andrews

Dr. Jay Barlow, NOAA Southwest Fisheries Science Center

Mr. Dave Moretti, Naval Undersea Warfare Center Newport

The SOCAL BRS is a multi-disciplinary team of biologists, acousticians, and technological developers. The objective of this project is to get a better understanding of reactions from marine mammals to Navy sonar by:

- Obtaining baseline behavior for key species for interpretation of responses to sound
- Conducting controlled exposure experiments on a variety of species and under different circumstances (including feeding, socializing, resting and traveling) with different sounds (including 'no sound' control trials)

The Fiscal Year (FY) 2012 approach of the BRS is to evaluate options for smaller, more flexible field teams ('fast and light'), compared to the baseline protocol that requires 12 or more staff deployed on one to two large vessels (40 to 65-plus feet in length) and two small boats (rigid-hulled inflatable boats) used for tagging and focal follow of animals during sound exposure). In 2010, the BRS team adapted and applied the BRS approach to SOCAL species, after prior experience with this research methodology on the AUTC range and western Mediterranean Sea. The greater number of species available in the Southern California Bight has resulted in an expanded list of species used in playbacks; large baleen whales like blue, fin, humpback and minke whales, and moderate sized toothed whales/dolphins like orcas, Risso's dolphins, as well as larger numbers of animals available to be tagged and included in playbacks. By October 2012, 94 individuals of nine species had been tagged, and 54 of those tagged animals had been involved in a full two to four hour playback study with pre-exposure observations, a 20 to 30 minute controlled sound exposure, and then one to two hours or more of post-exposure monitoring. The goal for 2013 through 2015 is to use Navy ASW sonar-equipped ships in pursuit of the eventual goal of documenting realistic sound exposures under realistic sonar usage scenarios.

SOCAL BRS Tagging Summary

SOCAL-10: 63 TAGS OF 6 TYPES ON 44 INDIVIDUALS OF 8 OR 9 SPECIES

Scouting & LEG I Tag Summary

56 tags of 5 types on 37 individuals of 6 or 7 species

25 days	Blue Whales	25 total individuals (21 Dtags; 9 Bprobes; 8 MK-10s)
	Fin Whales	7 total individuals (7 Dtags; 1 Bprobe)
	Sperm Whale	1 individual (2 Dtags; 2 MK-10; 1 satellite tag)
	Baird's Beaked Whale	1 individual (1 satellite tag)
	Possible Sei/Fin Whale Hybrid	1 individual (1 satellite tag)
	Bottlenose Dolphin	1 individual (1 TDR)

LEG II Tag Summary

7 tags of 2 types on 7 individuals of 4 species

10 days	Blue Whales	3 total individuals (2 Dtags; 1 ACOUSONDE)
	Risso's Dolphins	2 total individuals (2 Dtags)
	Bottlenose Dolphin	1 individual (1 Dtag)
	Cuvier's Beaked Whale	1 individual (1 Dtag)

SOCAL-11: 38 TAGS ON 4 TYPES ON 35 INDIVIDUALS OF 4 SPECIES

LEG I Tag Summary

22 tags of 2 types on 20 individuals of 2 species

14 days	Blue Whales	19 individuals (21 Dtags)
	Risso's Dolphin	1 individual (1 Dtag)

LEG II Tag Summary

14 tags of 4 types on 13 individuals of 4 species

14 days	Blue Whales	6 individuals (2 Dtags; 5 MK-10s)
	Risso's Dolphins	6 individuals (5 Dtags; 1 satellite tag)
	Bottlenose Dolphins	2 individuals (2 Dtags)
	Cuvier's Beaked Whale	1 individual (1 Dtag)

Dtag: A digital tag

LEG: Each field effort is divided into approximately "legs" of two weeks each, spanning seasons of interest, allowing for logistic limits of vessels and people and fitting effort in between Navy range closures for various training activities.

Bprobe: A type of acoustic recording tag

MK-10: A commercially available marine mammal tag that usually includes sensors for time, depth/pressure, temperature and light level

TDR: Time-depth recorder

ACOUSONDE: See Bprobe. ACOUSONDE is the new and improved model.

The BRS team is in its third year of sound playbacks to tagged whales on and around the Navy's SOCAL training range. Tagging summaries for the first two years of this effort are provided here. While beaked whales are the priority species, the cost and logistic challenges of this complex at-sea experiment require the researchers to respond opportunistically to any of the many species of whales and dolphins living in the rich habitat of the Southern California Bight. This is the most successful project to date in collecting the behavioral response data needed by the Navy and others to refine models of risk from human sound-producing activities like sonar training.

Researchers from Across the Globe

RESEARCHERS FROM A variety of academic institutions as well as Navy and other federal research facilities participate in the LMR program. Among those institutions and organizations represented at this IPR were the following:

1. Commander, Pacific Fleet
2. Duke University
3. Information Dominance/Director of Naval Intelligence
4. National Marine Fisheries Service
5. National Oceanic and Atmospheric Administration, Southwest Fisheries Science Center
6. Naval Air Systems Command
7. Naval Facilities Engineering Command
8. Naval Post Graduate School
9. Naval Sea Systems Command
10. Naval Undersea Warfare Center Newport
11. Office of Naval Research
12. Office of the Assistant Secretary of the Navy (Environment)
13. Oregon State University
14. San Diego State University
15. Scripps Institution of Oceanography
16. SEA, Inc.
17. Space and Naval Warfare Systems Command
18. The Cascadia Research Collective
19. U.S. Fleet Forces
20. U.S. Geological Survey
21. University of California, San Diego
22. University of California, Santa Cruz
23. University of Hawaii
24. University of St. Andrews, Scotland
25. Woods Hole Oceanographic Institution

Why is so much data needed? It's not just about the acoustic threshold—the received sound level at which animals can be seen to change their behavior. Factors such as species differences, differences in the playback source and its movements, and the behavior of the animal prior to exposure (including feeding, diving, and traveling) all have the potential to produce different outcomes. SOCAL BRS researchers, and the M3R team are collaborating with ONR-funded researchers to develop statistical methods to make the most of the data. The eventual translation of these data into risk metrics like acoustic dose-response functions does not fully express the influences of pre-exposure behavior state and position of the marine mammal at the time the marine mammal is receiving sound.

Obtaining statistically powerful controlled exposure data in a BRS is an expensive methodology. Reducing cost is therefore a high priority as experience in controlled playback methods is gained. Adapting the BRS technique and approach from the big team size and large ship and source down to small team and smaller size source could cut the cost of the project in half if the new methodology is still able to produce a comparable amount of data to the larger scope of effort.

Survey Methods Development & Testing

Dr. Len Thomas and colleagues, Center for Research into Ecological and Environmental Modeling, University of St. Andrews, St. Andrews, Scotland

Dr. Len Thomas and his team have partnered with Dr. Jay Barlow of NOAA Southwest Fisheries and other

LMR data providers to adapt the standard statistics for deriving animal density from survey data—called Distance. The Marine Mammal Protection Act requires the Navy to express marine mammal population status, trends and environmental effects in terms of animal density/abundance estimates derived from a variety of survey and sampling procedures, from aerial surveys to ship-based surveys, and largely spaced lines to point sampling and small-area intensive monitoring.

In addition to the LMR-supported survey methods development, Thomas and his team are developing comparable methods for fixed or towed passive acoustic sensor data, under funding from ONR, the inter-agency National Oceanographic Partnership Program and other sources. To accomplish this task, Dr. Thomas is collaborating with providers of large acoustic data sets under LMR funding, such as the data generated by the M3R program described above. Dr. John Hildebrand at Scripps Institution of Oceanography, as well as Dr. Jay Barlow and Dr. Sophie van Parijs at NOAA's Southwest and Northeast Fishery Science Centers.

The current power of passive acoustic density estimation is limited by the tools needed to automatically detect and correctly classify the sounds of various marine species. The LMR program, as well as ONR and other programs, are therefore investing in advancing the acoustic signal processing tools needed by M3R and other acoustic data collectors.

Anatomical & Modeling Studies of Cetacean Hearing

In addition to behavioral metrics of environmental effects from Navy

activity, Navy and the National Marine Fisheries Service use hearing-based criteria as a higher metric of risk aimed at preventing potentially injurious effects on hearing or other physiological processes. Historically, much of this work was supported by ONR, but a role remains for the LMR program to apply well-tested methods to remaining areas of uncertainty. One of the most challenging topics has been the development of hearing capability data for large whales and beaked whales—species that are difficult if not impossible to maintain in a laboratory setting for testing in the same way sea lions, dolphins and porpoises have been tested.

Using a common standard of scientific investment used by this program and others, LMR has funded two independent teams working in parallel to model hearing abilities based on the anatomy of the ear and associated anatomical structures. Their work is close to completion and will offer Navy planners and modelers improved confidence in risk models for the Navy's Phase III permits process beginning in FY14.

Finite Element Analysis of Hearing Anatomy & Interaction with Sound Energy

Dr. Ted Cranford, San Diego State University

This project has utilized detailed anatomical data from dissections and x-ray computed tomography ("CT scans") to build mathematical Finite Element Analysis (FEA) models of the hearing anatomy and its interaction with sound energy. First of all, the means for scanning large whale heads needed to be developed. Baleen whale heads, the size of a commercial truck or van, are too big for the medical CT scanners found in hospitals and

medical research facilities. Dr. Cranford developed the ability to use the Hill Air Force Base large CT scanner used to scan solid fuel rocket motors for bubbles and other defects that might affect the burn rate of the missile.

Among the unexpected discoveries revealed by the anatomical modeling was the finding that the primary sound reception pathway was not where they thought it would be. Rather than sound entering the ear by transmission through the fatty tissues in the jaw, Dr. Cranford and his colleague Dr. Peter Krysl, found that a lot of the acoustic energy enters underneath the lower jaw, which they dubbed the 'gular pathway.' The pathway of sound varies with the frequency of the sound, adjusting the relative loudness of different frequencies before they reach the inner ear, much as the outer ear or pinna of humans and other mammals selectively filters the frequencies of

incoming sound to optimize the frequencies of greatest interest for communication and environmental sensing. Another discovery was the role of the middle ear capsule, which houses the malleus, incus and stapes (hammer, anvil and stirrup) that transmits sound from the eardrum to the inner ear. In marine mammals, the eardrum appears to be relatively non-functional and the role of activating the middle ear bones is taken over by the walls of the middle ear capsule, which has been thinned and thickened in various places to facilitate sound transmission to the middle ear bones. This anatomical discovery applies to dolphins and other toothed whales, it is not certain that the middle ear works the same way in the large baleen whales. The closing phase of this project will focus on validating the model, to compare it to other measures of whale hearing such as evoked potential audiometry (measuring the electrical activity of

LMRAC Membership

MEMBERS OF THE LMRAC can be contacted at the following phone numbers and email addresses:

NAME	ORGANIZATION	PHONE	EMAIL
Gisiner, Bob (Chair)	NAVFAC	703-695-5267	bob.gisiner@navy.mil
Atangan, Joe	USFF	757-836-2927	joe.atangan@navy.mil
Dempsey, CDR Rachael	N2/N6	703-695-8266	rachael.dempsey@navy.mil
Fitch, Robin	OASN (EI&E)	703-614-0268	robin.fitch@navy.mil
Hesse, JT	NAVFAC	202-685-9296	jeffery.hesse@navy.mil
Johnson, Chip	COMPACFLT	619-767-1567	chip.johnson@navy.mil
Nissen, Jene	USFF	757-836-5221	richard.j.nissen@navy.mil
Olen, Jerry	SPAWAR	619-553-1443	jerry.olen@navy.mil
Rivers, Julie	COMPACFLT	808-474-6391	julie.rivers@navy.mil
Ugoretz, John	NAVAIR	805-989-4852	john.ugoretz@navy.mil
Vars, Tom	NAVSEA	401-832-5879	thomas.vars@navy.mil
Verderame, Deborah	NAVSEA	202-781-1837	deborah.verderame@navy.mil
Weise, Michael	ONR	703-696-4533	michael.j.weise@navy.mil

the auditory nerve and brain), and behavioral responses to sound in their environment.

Modeling Baleen Whale Hearing

Dr. Darlene Ketten, Woods Hole Oceanographic Institution

Mr. Dave Mountain, Boston University

Dr. Darlene Ketten and Mr. Dave Mountain have applied a similar process of anatomically derived Finite Element modeling, but have made more use of existing models of human and general mammalian middle ear and inner ear function. Since mammalian hearing physiology is generally conservative, these are considered reasonable extrapolations, modified for the anatomical differences measured by Dr. Ketten's laboratory. Dr. Ketten offered some preliminary results of modeled baleen whale hearing that will help to hone a number of assumptions about large whale hearing. One is that the lower frequency limit is not that different from humans, elephants and other low frequency 'experts', where sensitivity declines rapidly below 50 to 100 hertz (Hz) and cuts off around 10 to 20 Hz. There is a fuzzy boundary here where the vestibular system, which senses vibration and balance, may augment low frequency perception, but a puzzle remains about the actual functional role for energy in large whale vocalizations that goes as low as 15 to 20 Hz. The other surprise is that baleen whales may have the broadest range of hearing of any mammal, spanning a good eight to ten octaves. Whereas human hearing drops off around 14 to 20 kilohertz

For More Information


FOR MORE INSIGHTS into the LMR program, visit www.lmr.navy.mil.



(kHz), large whales appear to have good hearing up to as high as 30 kHz. The modeling results have at least some tentative support from behavioral observations of gray whales and other baleen whales clearly reacting to sounds at 20 to 24 kHz or even higher frequencies—well above the limits of human hearing.

Once these and other projects were reviewed, the LMRAC's work continued, reviewing and ranking the statements of research needs submitted by a broad range of Navy activities via the LMR web-based FY13 needs solicitation process. These ranked needs, once approved by CNO N45, will appear on the LMR website sometime in mid- to late-January, to initiate submission of pre-proposals for FY13–14 new starts. The availability of a Broad Agency Announcement will also be announced widely within and outside Navy.

The first annual LMR In-Progress Review was a great success—both in

acquainting Navy stakeholders with advances in scientific capability supported by the LMR program, and in acquainting researchers more directly with the Navy's needs for scientific information and technical capability in areas of Navy at-sea environmental compliance. The LMRAC, as representatives of the fleets and system commands affected by at-sea environmental issues like underwater sound, was impressed by the almost overwhelming wealth of information presented to them, but unanimously commended the new LMR program structure that opens up the research and development, test and evaluation decision making process within this program to all interested Navy parties. 

CONTACT

Bob Gisiner
Naval Facilities Engineering and Expeditionary Warfare Center
703-695-5267
DSN: 225-5267
bob.gisiner@navy.mil

GIVE US YOUR **Best Shot**

Erik Molina



Paul Block



CURRENTS IS LOOKING FOR YOUR BEST IMAGE

Hey, all you would-be photographers out there:
Give us your best shot.

How would you like to see your work published in a future issue of *Currents*? We know that, for many of you, photography is more than a casual pursuit. You love to capture unique views of the world with the click of a shutter. And we'd love to capture your best work.

So share your best shot with us and other *Currents* readers. We're looking for high quality, high-resolution imaginative images in the following areas:

- Natural resources on Navy installations
- Natural resources at sea
- Navy personnel protecting the environment
- Energy and environmental management projects on Navy installations and ships

With your submission, please provide your name, contact information, and a description of your image and how you shot it. Images must be submitted to our Managing Editor, Bruce McCaffrey at brucemccaffrey@sbcglobal.net in digital format (as .jpg files) at a resolution of at least 300 dots per inch (dpi).



Rafael Arnaldo Olivieri

To ensure quality printing, we need an ORIGINAL resolution (i.e., when the photo is taken) of at least 300 dpi. Your original file dimensions should be at least 2,100 by 1,500 pixels. So if you are using a digital camera, please set your file size to the largest size possible.

Help us present the Navy's energy and environmental management efforts through your creative eye. We'll take a careful look at all submissions and try to find space to display as much of your inspired work as possible.

SO GIVE US YOUR BEST SHOT!

Submit your own Best Shot to Bruce McCaffrey, *Currents'* managing editor, at brucemccaffrey@sbcglobal.net.

Kenneth Hess
CNO Energy and Environmental Readiness Division (Code N45)
2000 Navy Pentagon, Room 2E258
Washington, DC 20350-2000

OFFICIAL BUSINESS

CHANGE SERVICE REQUESTED

